CHAPTER 1
INTRODUCTION

Early adolescence has been described as “one of the most fascinating and complex transitions in the life span: a time of accelerated growth and change second only to infancy” (Carnegie Council on Adolescent Development, 1995, p. 10). During this period, individuals experience a confluence of biological, psychological and social change. Most early adolescents also undergo an important school transition as they move from primary to secondary school. New secondary school students face a multitude of changes, such as educational demands, teacher attitudes, grading systems, and a disruption of social networks (for reviews see Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984; Eccles, Wigfield, & Schiefele, 1998; Wigfield & Eccles, 2002).

Research has indicated that these transitions are both challenging and disruptive to students’ self-perceptions and social relationships, placing those who are unable to successfully negotiate the changes at increased risk for problematic developmental outcomes. Furthermore, it appears the ability of students to negotiate these transitions may have important implications for their long-term developmental pathway toward either healthy adjustment or psychopathology (e.g., Galloway, 1985; Roderick, 1995).

An important advance in contemporary research has been the study of individual differences in early adolescence, which has shown that the effects of the transition to adolescence and secondary school vary greatly from one individual to another. For some, the changes encountered during early adolescence may be overwhelming and undermine development. For others, however, the transition may be viewed as a challenge that promotes mobilisation of resources and provides an opportunity for psychological growth (Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Such research has been important in shifting the focus from transition difficulty to the identification of specific determinants of adaptation or risk and the mechanisms underlying particular outcomes (see Eccles, Lord, Roese, Barber, & Hernandez Jozeffowicz, 1997; Lord, Eccles, & McCarthy, 1994). Recent research in this area has indicated that various individual factors, such as personal competencies and coping style, and contextual factors, such as the availability and accessibility of
social support, may differentiate those who adapt well to the transition from those who do not (see Clark, 1995). In addition, the work of Eccles and her colleagues (e.g., Eccles. Lord, & Roeser, 1996; Eccles et al., 1993; Eccles, & Midgley, 1989, 1990; Wigfield & Eccles, 2002) has been influential in elucidating that the educational practices and environments of secondary schools can be crucial to the impact of transitions on early adolescent development. They highlighted that the shift to secondary school is associated with an increase in teacher control, comparative grading practices, competitive or individualistic goal structures, and a less-personal and positive teacher-student relationship (for review see Eccles et al., 1984; Eccles & Midgley, 1989). Moreover, their research has indicated that there may be a mismatch between the needs of developing adolescents and the opportunities afforded them by their social environments (e.g., Eccles & Midgley, 1989, Eccles et al., 1993). Eccles et al. (1993) noted, for example, that the deterioration in teacher-student relations is especially problematic during early adolescence when students are in need of close relations with adults outside of their homes.

As a result of previous research, and especially that of Eccles and colleagues, policy makers have called for improvements to be made to the quality of interpersonal relations in secondary schools.

For example, the Carnegie Council on Adolescent Development (1989), in their influential document, “Turning Points” stated that:

Most young adolescents attend massive, impersonal schools, learn from unconnected and seemingly irrelevant curricula, know well and trust few adults in school, and lack access to health care and counselling. Millions of these young people fail to receive the guidance and attention they need to become healthy, thoughtful, and productive adults…The time has come for a fundamental reassessment of this pivotal institution in the lives of these young people. (p. 13).

The call for schools to address these issues appears critical in view of recent statistics which suggest that a substantial portion of adolescents are not adjusting well with the changes of early adolescence. Recent estimates indicate that between 17 to 22 percent of adolescents suffer from developmental, behavioural or emotional problems; 29 percent experiment with illicit drugs; and increasing numbers of

Awareness of the problems facing adolescents and has led researchers and practitioners to advocate the implementation of school-based intervention strategies to help facilitate the transition to adolescence and secondary school (see Roderick, 1995). In recent years, peer-led interventions have been highlighted as a possible solution to addressing students’ problems. Given adolescents’ inclination to prefer to be influenced by their peers, as well as the available pool of potential peers within school contexts, the potential of peers helping peers is both compelling and feasible. The potential of peer support programs was brought to attention by Wassef, Ingham, Lassiter Collins, and Mason (1995), who stated that:

Considering that the normal maturational process in adolescents leads to greater intimacy in relationships with peers, and the fact that adolescents frequently reach out to peers for help, more consideration should be given to assessing the use of peer support groups in high schools. If proven effective, they can serve as a more economical approach to reaching the majority of the students in distress before more serious problems arise. (p. 536)

As a result of these recommendations, there has been a recent surge of various forms of peer support programs in secondary schools, such as befriending, peer counselling and peer mediation programs. However, large-scale empirical studies on their effectiveness are rare and the studies that have been conducted to date are compromised by anecdotal evaluations, the use of instrumentation with unsubstantiated psychometric properties, absence of control groups, as well as a deficiency of evaluation and follow-up. Furthermore, the potential impact of these programs on the peer leaders (i.e., students who facilitate the peer support groups) has also largely been ignored. Although some have speculated on the potential benefits of serving as a peer support leader, noting gains to self-esteem, listening skills, and pro-social attitudes (Charlton, 1998), very little empirical research has been conducted in this area. Thus, there is a need to explore the outcomes of these
programs on both the younger participants and the peer leaders (Cowie, Naylor, Chauhan, & Smith, 2002). As Zaslow and Takanishi (1993) have emphasised:

Research on the development of adolescents has made significant progress over the past 10 to 15 years, but is not yet fully mature. Future research must...balance pressures to implement urgent preventive interventions for adolescents with the need for systematic evaluations that will lead to improvements in these approaches, including those that promote healthy patterns in all adolescents and target clusters of health compromising behaviours rather than just single ones. (p. 185).

The present thesis was specifically designed to address these issues by examining the effectiveness of a widely-used peer support program in Australian secondary schools. This program is administered to Year 7 students by Year 10/11 students and aims to alleviate problems associated with adolescence by enhancing school self-concept, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility for the future. The primary aims of the present investigation were to extend theory, research and practice by (a) identifying, developing and evaluating psychometrically sound measurement instruments for use with secondary school students; (b) test the impact of the peer support program on espoused program outcomes and other aspects of students' psychological well-being adjustment to the secondary schooling context; (c) extend previous research by elucidating the effects of serving as a peer support leader on leadership ability and other psychological constructs; and (d) identify participants' (Year 7 students and peer leaders) perceptions of the impact, strengths and limitations of the program in order to further strengthen peer support intervention design.

This study addresses key deficits that have occurred in previous research by examining the effects of the intervention, not only on the Year 7 students, but also on their peer support leaders (Year 10/11 students). Major methodological limitations that have pervaded previous research were avoided by (a) employing a strong longitudinal quasi-experimental design with control groups and baseline data against which to compare the effects, (b) critically examining the psychometric properties of the instrumentation employed to test the intervention effects, (c) including a large sample size and participation from several secondary schools, (d) incorporating a synergetic blend of quantitative and qualitative research methods to investigate the
effects of the intervention, as well as (e) conducting sophisticated statistical analyses in the context of a strong, methodologically sound research design.
CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this chapter is to establish the rationale for conducting the current investigation and to present an overview of previous research elucidating important factors that may affect successful adjustment to adolescence and secondary school. Firstly, the results of previous studies are critically examined to demonstrate that the transition to adolescence and secondary school has been identified as an issue of theoretical and practical significance. Research identifying important factors that affect adjustment is then presented, followed by a review of evidence examining the impact of school-based intervention programs. Finally, the implications of research evidence for the present investigation are discussed. The current chapter substantiates the view that the transition to adolescence and secondary school is problematic for many adolescents and identifies key factors and potentially significant programs that may serve to ease this transition.

The Impact of Transition to Adolescence and Secondary School: An Overview of Research Evidence

*It has been clear for some time that the entry to junior high school probably represents the most abrupt and demanding transition of an individual's entire educational career. This is a crisis period that has important educational as well as personal consequences.*

_Hamburg, 1974_

Early adolescence has been described as a pivotal stage of development that is marked by a confluence of biological, psychological and social change. During this period, adolescents simultaneously deal with physical and cognitive transformations, increases in peer pressure, greater interest in the opposite sex, and desire for personal independence (Mergendoller, Swarthout, & Packer, 1982) Furthermore, social bonds with parents are transformed as relationships with peers take on new meaning and deepen in intensity (Berndt, 1982). These new bonds broaden and enrich the world of the adolescent, but also result in increased possibilities for loss, rejection, and conflict. Around the same time that adolescents are undergoing these changes, many
are also undergoing the transition from primary to secondary school. New secondary school students face a multitude of changes, such as differences in educational demands, teacher attitudes, grading systems, and a disruption of social networks (e.g., Eccles & Midgley, 1989).

As a result of the tremendous changes faced during early adolescence, this period has historically been described as a period of “storm and stress”. Although it is now recognised that most individuals pass through adolescence without excessively high levels of turmoil, many do experience difficulty as a result of this transition. Contemporary researchers emphasise that early adolescence marks the beginning of a downward spiral for some that eventuates in school failure, premature school dropout and maladaptive psychological functioning (Eccles et al., 1996, p. 49). Research evidence regarding changes in early adolescent self-perceptions, school achievement and psychological functioning is reviewed in the following sections.

**Impact of Transition Upon Self-Esteem and Self-Concept**

A considerable body of literature has discussed the emergence of new cognitive capacities during adolescence, such as the ability to think abstractly, engage in more sophisticated information processing strategies, and reflect on oneself (see Keating, 1990). With these newfound capabilities, adolescents face the challenging task of attempting to integrate diverse self-attributes and multiple selves into a coherent sense of self (Harter, 1990). An exciting hallmark of recent research has been the shift in focus from an analysis of one’s overall sense of self (global self-esteem) to the measurement of multiple facets of self-concept. Marsh and his colleagues (for review, see Marsh & Craven, 1997), as well as Harter (1982, 1990), have done a considerable amount of empirical work in this area. Their research has been very important in demonstrating the existence of separate dimensions of self-concept even in very young children (e.g., Harter, 1982; Craven, Marsh, & Debus, 1991; Marsh, Ellis, & Craven, 2002), as well as the increasing differentiation and complexity of self-concepts with age (e.g., Harter, 1990; Marsh, 1989; Marsh, Craven, & Debus, 1998).

Empirical research in this area is particularly strong in research involving the Self-Description Questionnaire instruments (SDQI, SDQII, SDQIII; see Marsh &
Craven, 1997 for an overview) designed for students of differing ages. These instruments measure self-concepts in a variety of domains, using Shavelson, Hubner, and Stanton's (1976) model of self-concept as a theoretical basis. According to the Shavelson et al. (1976) model, self-concept is multidimensional and hierarchical, with specific aspects of self-concept at the bottom of the hierarchy (e.g., maths and physical ability self-concepts), broader domains of self-concept in the middle of the hierarchy (e.g., academic and non-academic self-concepts) and global self-esteem at the apex. Research involving the SDQ instruments has provided good support for the Shavelson et al. (1976) model and demonstrated that self-concept cannot be adequately understood if its multidimensionality is ignored.

The issue of stability in self-perceptions at early adolescence has been an important concern for a number of researchers (see Harter, 1998). In their classic study, Simmons, Rosenberg, and Rosenberg (1973) found that young adolescents, compared to children in Years 3 to 6, exhibited heightened self-consciousness, instability of self-image, lower confidence in their academic ability and lower global self-esteem. However, subsequent studies on changes in self-perceptions yielded a mixed pattern of results (see Eccles & Midgley, 1989, for review). Eccles, Wigfield, Reuman and Maclver (1987) found declines in general self-esteem between Years 6 and 7 when students moved from primary to secondary school. Similarly, Simmons and Blyth (1987) found a decline in general self-esteem during early adolescence but only for girls. Other studies, however, found little evidence of any decline during the early adolescent years in general self-esteem (Fenzel & Blyth, 1986; Hirsch & Rapkin, 1987). Furthermore, O'Malley and Bachman (1983) and Nettelmann (1987) actually found small increases in self-esteem through the adolescent years. In sum, early research on self-esteem showed no consistent pattern of age effects in adolescent self-perceptions.

However, more recent research utilising multidimensional self-concept instruments has been much more consistent in demonstrating that self-perceptions decline during the adolescent period. For example, Marsh’s (1989) large cross-sectional study found clear support for the decrease of various self-concept domains from early preadolescence to middle adolescence. This investigation is noteworthy as it incorporated a large sample size (7,954 students in Year 2 through university), examined nonlinear effects, and was based on responses to well-standardised
multidimensional instruments. The results of this study provided strong evidence for the posited age effects of self-concept and specified that inconsistencies in previous research were a product of methodological problems that have plagued self-concept research. Cole et al. (2001) also examined changes in multiple dimensions of self-concept in 1,920 students spanning Years 3 through 11. This investigation utilised a longitudinal design and employed advanced multilevel modelling data analytic procedures. Five dimensions of self-concept were evaluated every six months for six years. The results of this study indicated that the transition to secondary school is associated with destabilisation in four self-concept domains (academic competence, physical appearance, social acceptance, and sports competence) and precipitous reductions in two self-concept domains (academic competence and sports competence). Most notably, the transition was marked by a large and significant drop in self-perceived academic competence. Studies such as these have been important in demonstrating the imperative of employing multidimensional measurement instruments in self-concept research and revealing that particular domains self-concept decline significantly during the adolescent period (for review see Harter, 1998).

Related research on student’s competence and value beliefs has provided further evidence for the declines in self-perceptions during the adolescent years. A recent American study examined changes in 761 student’s self-perceptions across Years 1 through 12 within the domains of mathematics, language, arts and sports (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; also see Fredricks & Eccles, 2002). The most striking finding of this study was that self-perceptions declined across all domains, as students got older. Watt (2004) extended this work by examining changes in 1,323 student’s math and English self-perceptions across Years 7 to 11 in the Australian context. In accordance with the earlier findings of Jacobs et al (2002), Watt (2004) found that self-perceptions declined through adolescence, but were particularly vulnerable to declines following the transition from primary to secondary school.

A further development in contemporary research has been the study of individual differences in self-perception research. For example, Hirsch and DuBois (1991) examined longitudinal differences in global self-esteem trajectories over a two-year period encompassing the transition from primary to secondary school. Their
results revealed four markedly different self-esteem trajectories: consistently high, chronically low, steeply declining and small increase. This study is particularly important because it showed that a substantial group of students (21% of the sample) had a steeply declining self-esteem trajectory. These adolescents reported high self-esteem in primary school. However, as they moved into early adolescence and the transition to secondary school, their self-esteem took a “dramatic, continuous dive” (Hirsch & DuBois, 1991, p. 68). Similarly, Harter, Whitesell and Kowalski (1992) examined individual differences in the effects of the secondary school transition on early adolescents’ perceptions of competence. Data was collected from 463 students before and after the school transition. Their results identified three separate groups of students: Those whose self-perceptions increased, decreased or remained the same across the transition. In their study, approximately 28% of the sample constituted the “decreasing” perceived competence group, which is comparable to the findings of Hirsch and DuBois (1991). These results indicate that a considerable percentage of students exhibit declines in self-perceptions following the transition to secondary school.

In sum, recent developments in self-concept theory and research have helped to clarify issues regarding stability and change in students’ self-perceptions during the transition to secondary school and adolescence. Research employing multidimensional instruments has shown that various domains of self-concept decrease from early adolescence to middle adolescence. However, recent research employing an individual difference approach has demonstrated that the effect of the transition varies from person to person. Not every young adolescent experiences these changes to the same extent—or even in the same direction (Block & Robins, 1993; Harter, 1998; Hirsch & DuBois, 1991). What is becoming apparent though is that a considerable number of students do experience steeply declining self-perceptions as a result of the transition (Hirsch & DuBois, 1991).

**Impact of Transition Upon Attitude to School and Academic Achievement**

Previous research also suggests that along with declines in self-concept discussed above, adolescents’ attitudes to school also deteriorate during the transition to secondary school. For example, Eccles, Midgley, et al. (1984) reviewed research evidence from 24 studies examining developmental shifts in self-evaluative beliefs
and achievement motivation constructs. In most of the studies surveyed, Eccles, Midgley et al. found that students’ attitudes towards school declined with age. In addition, several of the reviewed studies suggested that the magnitude of this decline varied across grade levels. Notably, Eccles, Midgley et al. reported that the decline in students’ attitudes towards school appear to be most marked when students underwent the transition to secondary school. Other researchers have also reported that during the early adolescent period there are significant declines in classroom engagement (Skinner, Zimmer-Gembeck, & Connell, 1998); increased negative attitudes towards learning (Brush, 1980); lower levels of intrinsic motivation (Gottfried, 1981; Harter 1981); increased anxiety about school (Harter, Whitesell, & Kowalski, 1987); and a reduction in class preparation (Seidman, Allen, Aber, & Mitchell & Feinman, 1994). In addition, a number of studies have found that academic achievement declines markedly following school transitions (e.g., Alspaugh & Harting, 1995; Crockett, Petersen, Graber, Schulenberg, & Ebata, 1989; Felner, Primavera, & Cauce, 1981; Reyes, Gillock, & Kobus, 1994; Simmons & Blyth, 1987; Schulenberg, Asp, & Peterson, 1984; Seidman et al., 1994). For example, Felner et al. (1981) examined changes in the academic adjustment of 250 students from three secondary schools. Their research found that the transition to secondary school was significantly related to lower school grades and school attendance. Furthermore, these findings have long-term broader adaptive implications. Both lower grades and absenteeism have emerged as important predictors of later school failure and premature school dropout (Roderick, 1995), as well as more serious forms of emotional dysfunction during adolescence and adult life (Galloway, 1985).

Relatively few studies have examined the extent to which grade declines following school transitions vary from student to student. However, Roderick (1995) studied trends in academic achievement and school retention of 757 students following the transition to secondary school. This study demonstrated that the degree to which a student’s grades declined following the transition was related to his or her later school outcomes. In particular, the average academic grade of students who later became school dropouts declined by about 14 percent following the transition, compared to a decline of approximately four percent in the average grades of those who later graduated from school. This study was important in demonstrating that (a)
some students experience very moderate grade declines, while others see dramatic changes in their grades; and (b) that students who experience dramatic declines in their grades during their first year of secondary school face an increased risk of dropping out of school. Further research has also provided evidence to suggest that students who have a history of repeated school transfers or who are from an ethnic subgroup may be particularly vulnerable to dramatic grade declines following the transition (Felner et al., 1981; Simmons, Black, & Zhou, 1991).

Thus, previous research has indicated that students generally exhibit a decline in their attitudes towards school and school achievement following the transition to secondary school. However, more recent research, and especially that of Roderick (1995), suggests that the effects of the transition vary from person to person. Not all adolescents experience declines in school attitudes and achievement to the same extent. What is clear though is that a student’s ability to negotiate these school changes can have important implications their continued progress in school and emotional function during adolescence and adult life.

**Impact of Transition Upon Psychological Functioning**

Previous theory and research also suggests that psychological problems become more prevalent during the adolescent period. The aforementioned “storm and stress” theory of adolescence was largely based on the theoretical work of the psychoanalytic clinicians in the 1950s and 1960s (Blos, 1962; Freud, 1946, 1958, 1968). These clinicians portrayed this period as a time of heightened emotional volatility, depressed mood, and conflict with parents (Blos), as well as “dissocial, even criminal” behaviour (Freud, 1968, p. 18). Anna Freud perceived adolescents who did not experience emotional crisis and upheaval with great suspicion, claiming that their outward calm concealed the inward reality. She viewed adolescent turmoil as inevitable and necessary, to the extent that its absence signified psychopathology: “To be normal during the adolescent period is by itself abnormal” (Freud, 1958, p. 267). Therefore, according to Freud, many of the symptoms or serious difficulties that would signify mental illness in adulthood or childhood represent part of normal development in adolescence.

However, the psychoanalytic view of adolescence is generally not supported by contemporary theory and research. It is now widely acknowledged that
psychological turmoil is not characteristic of the majority of adolescents. However, epidemiological studies have demonstrated that between 17 and 22 percent of adolescents suffer from developmental, emotional or behavioural problems (see Kazdin, 1993). Hence, whilst it is clear that psychological turmoil is not characteristic of all adolescents, evidence supports the existence of maladaptive psychological functioning for a sizable number of adolescents.

Research evidence also supports the existence of some degree of psychic and interpersonal stress during adolescence, because this period is linked with heightened vulnerability to a number of psychological disorders. For example, rates of depression have been found to rise dramatically during adolescence, especially for females (Cohen et al., 1993; Kazdin, 1993; Petersen et al., 1993). Furthermore, previous research has indicated that up to 35 percent of adolescents experience depressed mood at some time and as many as seven percent have diagnosable depressive disorders (Petersen et al.). The adolescent period has also been linked to increases in prevalence rates of eating disorders, conduct disorders and oppositional defiant disorders (Cohen et al.). These findings are of particular concern given that research has demonstrated that the emergence of psychological difficulties in adolescence is likely to continue into adulthood (e.g., Aalto-Setala, Marttunen, Tuulio-Henriksson, Poikolainen, & Lonqvist, 2002; Pine, Cohen, Cohen, & Brook, 1999; Pine, Cohen, Gurley, Brook, & Ma, 1998). For example, Aalto-Setala et al. examined the association between depressive symptoms in adolescence and mental well-being in early adulthood. In their study, 651 participants completed questionnaires when they were in secondary school and again five years later when they were young adults. This study provided strong evidence to suggest that depressive symptoms in adolescence predicted adulthood depressive disorders, psychosocial impairment and problem drinking. Thus, studies such as that of Aalto-Setala et al. have clearly illustrated the fallacy of early psychoanalytic views that serious psychological difficulties are a part of normal development and likely to pass with time.

Consequently, although the extreme portrayal of adolescent storm and stress by certain psychoanalytic theorists has been discredited, contemporary research supports the view that there is an increased tendency for psychological unrest in adolescence. Recent studies have demonstrated a clear rise in the rates of
psychological disorders during adolescence and have also provided evidence for the continuity of these disorders through to adulthood. As Arnett (1999) emphasised, "not all adolescents experience storm and stress...but adolescence is the period when storm and stress is more likely to occur than at other ages" (p. 317).

Summary: The Impact of Transition to Secondary School Upon Adolescents

In summary, previous research provides evidence that the transition to adolescence and secondary school can be challenging and potentially disruptive to self-perceptions and adolescent functioning, placing youth who do not successfully negotiate the transition at increased risk for long-term developmental outcomes. More recent research has suggested, however, that not all youngsters are equally predisposed to risks associated with early adolescence. It seems that many students make successful adjustments, while others experience greater difficulties negotiating the challenges of adolescence. Recent studies suggest that the path that students take may depend on the individual characteristics or experiences of adolescents (Rudolph et al., 2001). In the following section, research evidence is presented that elucidates some of the factors that may affect adjustment to secondary schooling contexts.

Unravelling the Factors that Affect Adjustment

*Imagine three dolls lying side by side. One doll is made of china, another is made of metal, and the third doll is made of rubber. A person strikes a hammer against each doll. The china doll shatters into a million pieces, never to be repaired. The metal doll is dented, but doesn’t break. The rubber doll barely shows any marks and bounces back to its original shape.*

Clark, 1995

Adolescents can be likened to the dolls described above—each so different in their ability to cope with this crucial time in their lives. Contemporary studies indicate that various individual factors, such as personal competencies and coping style, and contextual factors, such as the availability and accessibility of instrumental and affective social support, may differentiate those who adapt well to the transition from those who do not. Research evidence regarding personal and social resources that may assist adolescents in successfully negotiating the transition is reviewed in the following sections.
Coping Resources

Several investigators have suggested that internal coping resources are key influences on one's adjustment to stressful situations (e.g., Peterson, Kennedy, & Sullivan, 1991). As children enter puberty and progress through adolescence, they develop a variety of coping strategies, such as problem-solving, seeking social support and distancing (Williams & McGillicuddy-De Lisi, 2000). Researchers have conceptualised students' coping responses into two broad dimensions: approach and avoidance strategies (Moos, 2002). Approach strategies involve making active attempts to manage or remedy the stressful situation (e.g., seeking social support to solve the problem), while avoidance strategies are aimed at reducing psychological discomfort by simply escaping from or denying the existence of the stress (Causey & Dubow, 1993; Herman-Stahl & Petersen, 1996). Utilising this framework in an adult sample, Roth and Cohen (1986) found that individuals showed an inclination toward one of these two orientations and indicated a high degree of consistency in their coping style when dealing with a major life event.

According to Seiffge-Krenke (1995), approach coping strategies are functional, while avoidant strategies are dysfunctional. Contemporary research has provided strong evidence to support the latter part of this proposal, with various studies finding that adolescents with avoidant coping strategies are more likely to develop psychological distress or problems in adaptation (Chan, 1995; Dumont & Provost, 1999; Ebata & Moos, 1995; Herman-Stahl, Stemmler, & Peterson, 1995). Similar results have been found with children (Asarnow, Carlson, & Guthrie, 1987; Garber, Braafladt, & Zeman, 1991). Depressed children generate more irrelevant strategies for coping than non-depressed children, and they are more likely to suggest avoidant or negative behaviours as strategies for alleviating negative affect.

There is also evidence to suggest that approach-oriented coping strategies are associated with better outcomes (Causey & Dubow, 1993; Herman-Stahl & Petersen, 1996; Printz, Shermis, & Webb, 1999). For example, Causey and Dubow (1993) investigated the contributions of Year 7 students coping strategies to predicting changes in their adaptation during the transition to secondary school. A total of 162 students completed measures three weeks into the new school year and again three months later. Zero-order and cross-lag correlations showed that the use of approach
coping strategies was associated with higher levels of perceived coping effectiveness and general adaptation to secondary school.

**Social Support**

Along with coping resources discussed above, social resources have been considered to mediate the relation between stress and adjustment. Families, friends and significant others may help adolescents cope by providing advice, securing resources needed to address problems, or offering occasions for self-disclosure and emotional release (Berndt, 1989). Although there is accumulating evidence that support from family is important in promoting adolescent psychological well-being and in buffering the emotional effects of stress (e.g., Barrera, Chassin, & Rogosch, 1993; Helsen, Vollebergh, & Meeus, 2000; Isakson & Jarvis, 1999), less is known about the role of peer social support at this age.

Although support from peers has received little empirical attention, the literature on adolescent friendships provides evidence to suggest that peers may be important sources of support for students in times of stress. Peer relations, while important to development during early to middle childhood, take on increasing importance during adolescence (Berndt, 1982). During this time, both the time spent with friends as well as the intimacy of these friendships increase greatly (Berndt & Perry, 1990). It is widely acknowledged in the literature that friendships during childhood and adolescence contribute to overall social adjustment (Bukowski, Newcomb, & Hartup, 1996; Ladd, 1990). It has also been proposed that through friendship relations, youngsters learn about nurturance, self-control, and the reciprocal processes of give-and-take needed for social competence (see Gauze, Bukowski, Aquan-Assee, & Sippola, 1996). Furthermore, recent research has elucidated the important role that peer relations play in the development of adolescents' emotional stability (i.e., calmness and freedom from anxiety and depression; Hay, Ashman, & Ballinger, 2000; Hay & Ashman, 2003).

During adolescence, peers also become increasingly important as a source of security and support (Berndt, 1982). While parents continue to provide guidance and encouragement, adolescents report that they receive as much or if not more support from their friends (Degirmencioğlu, Urberg, Tolson, & Richard, 1998; Helsen et al., 2000; Levitt, Guacci-Franco, Levitt, 1993). Various studies have also demonstrated
that adolescents would prefer to turn to peers rather than parents for information, support in times of stress, and advice on personal problems (e.g., Fenzel & Blyth, 1986; Sebald, 1989; Vineland, Whittle, Garland, Hicks, & Schaffer, 1991). For example, Vineland et al. found that 72 percent of students reported that if they had emotional or personal problems they would talk to a friend. They also discovered that in response to questions related to helping friends who felt depressed or who were thinking about suicide, the majority of students indicated that, rather than seeking assistance from adults, they would endeavour to help their friends on their own or together with other friends. Consequently, such research findings suggest that adolescents’ peers play a significant social support role.

Several researchers have suggested that support for peers may prove especially beneficial for students undergoing the transition from primary to secondary school. Berndt and Hawkins (1985) found that, in speculation of entry to secondary school, sixth graders were most concerned about changes in their peer group. Furthermore, seventh graders who saw themselves as having made a “good start” in secondary school most frequently attributed their success to the presence of old friends and the making of new friends (Mittman & Packer, 1982). Research has also indicated that peer social support during the last year of primary school is related to adjustment during the transition to high school (Berndt, Hawkins, & Jiao, 1999; Hirsch & DuBois, 1992). For example, Hirsh and DuBois, in their study of the longitudinal relation between peer social support and psychological symptomatology, collected data from early adolescents over a two-year period spanning the transition from primary to secondary school. They found that prior levels of social support were negatively related to subsequent levels of symptomatology for the period when students moved from primary to secondary school. Studies such as this suggest therefore, that peer relations are important sources of support for early adolescents in times of stress.

*Expectancies for Success*

Previous research also suggests that students’ expectancies are important influences on one’s adjustment to stressful situations. The study of expectancies figures prominently in the theories of self-efficacy and optimism. Bandura (1986) defined self-efficacy as expectancies in one’s capabilities to manage prospective
situations. Similarly, Scheier and Carver (1985) defined optimism as a generalised expectancy that one will experience good outcomes in life. In general, research on self-efficacy and optimism indicates that high expectancies of success are beneficial because people who expect to succeed do perform better than those who are less optimistic (Brown & Marshall, 2001). In large part, this is because people with high expectancies for success tend to work harder and persevere longer even when progress is slow and difficult (see Puskar, Sereika, Lamb, Tusae-Mumford, & McGuinness, 1999). Thus, Bandura (1986) and Scheier and Carver (1985) argued that expectancies for success lead to continued perseverance.

In the past, most studies on expectancies employed adult populations. However, in recent years, increased attention has been given to adolescent modes of thinking. For example, Boman and Yates (2001), in their study on adjustment to secondary school, found that generalised expectancies for success were related to higher levels of classroom involvement and student adjustment, as well as lower levels of school hostility. Self-efficacy and optimism have also been associated with a lower incidence of psychological and physical symptomatology (e.g., Herman-Stahl & Petersen, 1996; Puskar et al., 1999; Seligman, 1990). For example, Herman-Stahl and Petersen, in their examination of the protective role of coping resources for depressive symptoms among young adolescents, found that high prior levels of optimism were associated with fewer subsequent depressive symptoms.

Although self-efficacy and optimism have been defined as a character trait that evolves during childhood (e.g., see Puskar et al., 1999), recent research has shown that people can be taught to have higher expectancies for success. For example, Cunningham, Brandon and Frydenberg (2000) examined the effectiveness of an eight-week program designed to increase coping resources in students aged nine to thirteen through the modelling and teaching of optimistic skills in response to real and hypothetical events. After participating in the program, students reported significant improvements in optimistic thinking and self-efficacy. Moreover, their results indicated that by teaching students to think more optimistically, they also learned to use fewer of the maladaptive coping strategies of worry, wishful thinking, avoidance, and self-blame.
School Connectedness

In recent years, researchers have begun to examine the effects of school connectedness or school belonging on various outcomes. School connectedness can be defined as an adolescent’s experience of caring at school and a sense of closeness to school personnel and environment (Resnick, Bearman, Blum, & Bauman, 1997). Results from a variety of studies have indicated that perceiving a sense of belonging or connectedness with one’s school is related to enhanced health, motivation, achievement, attitudes toward school, and extracurricular involvement (Battistich, Solomon, Watson, & Schaps, 1997; Bonny, Britto, Klostermann, Hornung, & Slap, 2000; Roeser, Midgley, & Urdan, 1996). The study of Bonny et al. (2000) sought to identify potentially modifiable factors that differentiate students who do and do not feel connected to their schools. Their study consisted of a sample of 3,491 students in Years 7 through 12. Stepwise linear regression identified that decreasing school connectedness was associated with declining health status, increased school nurse visits, cigarette use and lack of extracurricular involvement. In addition, Anderman (2002) employed hierarchical linear modelling techniques to examine the relations between school belonging and psychological outcomes in a large sample of 20,745 students. This study was eminent in demonstrating that individual students’ perceptions of belonging were negatively related to depression, social rejection, and school problems.

Research has also indicated that school connectedness may be an important factor preventing youngsters from engaging in negative health behaviour (Clark, 1995). For example, Benard (1991) found that adolescents who felt connected to their school reported feeling more efficacious in making healthy, informed decisions and displaying features of resiliency to potential life stressors. More recently, Resnick et al. (1997) examined cross-sectional data of 12,118 adolescents in Years 7 through 12 to identify risk and protective factors for eight different health risk outcomes. They found that school connectedness served as an important protective factor against absenteeism, delinquency, polydrug use, unintentional injury, and pregnancy. Recent research also suggests that low levels of school connectedness contribute to school dropout and violence. Using principal components analysis, Hunt et al. (2002) found that school connectedness emerged as a strong factor in relation to the school dropout and violence.
Summary: Factors that Affect Adjustment

In summary, the findings of previous research suggest that a successful transition to adolescence and secondary school is more likely for students who have high levels of coping and social resources. In addition, these results indicate that individual factors (e.g., coping strategies and expectancies for success) and contextual factors (e.g., social support and school connectedness) play an important role in moderating the relation between stress and well-being. Further research evidence regarding the importance of the student’s social environment in fostering positive adjustment is reviewed in the following section.

The Nature of Student’s Social Environment

There is a considerable lack of fit between what we know about young adolescents and what we do to them five days a week in school.

Lipsitz, 1977

The work of Eccles and her colleagues (e.g., Eccles, Lord, & Midgley, 1991; Eccles et al., 1996; Eccles et al., 1993; Eccles, & Midgley, 1989, 1990; Wigfield & Eccles, 2002) has been prominent in demonstrating that the nature of the social environment can be crucial to the impact of transitions on early adolescent development. Drawing on ‘person-environment fit’ theory (see Hunt, 1975), Eccles and Midgley (1989) proposed that some of the negative psychological changes associated with early adolescence result from a poor match between the developing adolescent’s needs and aspects of their social environment. According to person-environment fit theory, the well-being of the individual is mitigated by the characteristics of the environment that meet or impede the person’s needs. Individuals are not likely to do well, or be motivated, if they are in social environments that do not meet their psychological needs. Following this line of reasoning, Eccles and Midgley (e.g., Eccles & Midgley, 1989; Eccles et al., 1993) suggested that developmentally appropriate school contexts, ones that stimulate positive growth and are responsive to the developmental tasks confronting young adolescents, are critical in the facilitation of positive development. In contrast, developmentally inappropriate educational environments impede the adolescent’s development and lead to unfavourable outcomes.
Eccles et al. (1993) reviewed the evidence regarding systematic changes in the classroom environment associated with the transition to secondary school. Among the changes cited, they reported fewer opportunities for student decision making, a greater emphasis on teacher control, an increase in between-classroom ability grouping, a decreased emphasis on developmentally appropriate cognitive challenge, and a disruption to social networks. As youngsters move through adolescence, they are developing cognitively, and typically express a desire for more control over their own lives. At the same time, they are becoming increasingly self-focused, self-conscious, and concerned with peer relationships (Eccles et al. 1991). Consequently, the secondary school classroom environment may represent a mismatch with the psychological needs of youth and result in the unfavourable outcomes associated with the transition to secondary school. In support of this view, there is an increasing body of evidence to suggest that, as students move from primary to secondary school, changes in the nature of the learning environment can precipitate changes in academic motivation, achievement, behaviour, and psychological adjustment (e.g., Eccles et al., 1993; Midgley, Anderman, & Hicks, 1995; Roeser & Eccles, 1998). Roeser and Eccles (1998), for example, examined changes in 1,046 adolescents’ academic and psychological functioning following the transition to secondary school. Their study showed that students’ perceptions of school were significant predictors of their academic and psychological functioning at the end of Year 8 after controlling for prior adjustment assessed at the beginning of Year 7. For instance, they found that perceptions of an emphasis on competition and social comparison were associated with diminished academic values, self-esteem and academic achievement and increases in school truancy, anger and depressive symptoms over time.

In consequence, the focus of Eccles and her colleagues on the nature of the learning environment associated with the transition to secondary school appears to be a plausible explanation for the declines in adolescents’ self-perceptions and school-related measures evidenced by the research discussed earlier in this chapter. Based on their research, Eccles and Midgley (1989) proposed that many secondary schools are not providing appropriate educational and social environments for early adolescents. Consequently, research in this area suggests that, in the development of preventative efforts, it may be important to attend to the key aspects of student’s
social environments that could be changed to facilitate student's adaptation during this transition.

**School Settings Affecting Transition**

Felner, Ginter and Primavera (1982) have suggested that the nature of the social setting confronting students during the transition to secondary school may, in part, account for the heightened vulnerability to maladjustment associated with this particular school change. They argue that at the beginning of the school year the "entire social system is in a state of flux" with incoming seventh grade students, generally coming from several different primary schools, attempting to adapt to the new setting at the same time (p. 279). Not only are new students confronted with a new physical environment, they must also learn new school and teacher expectations, rules, and regulations. Furthermore, previous research suggests that they are often moving to a larger, more departmentalised setting, with different sets of teachers and peers in each class daily, as well as a wider range of curriculum choices and extracurricular activities (Eccles, Midgley et al., 1984; Simmons & Blyth, 1987). Furthermore, Newman, Lohman, Newman, Myers and Smith, (2000) interviewed a sample of 29 students to ascertain their perceptions of the challenges they faced following the transition to secondary school. Students reported that academic difficulties, adjusting to the new school environment, increased social demands, and new interactions with teachers made the transition particularly challenging.

Felner et al. (1982) also suggested that teachers may be limited in their ability to provide information and support to new secondary school students (Felner et al., 1982; Felner & Adan, 1988). They argued that teachers are in a state of flux at the beginning of the school year, as they endeavour to get to know large numbers of new students and adapt to modifications in the subject matter and year group that they are teaching. Furthermore, because students have a different teacher for each subject it may be more difficult for students and teachers to form close professional relationships throughout secondary school. Indeed, previous research has indicated that secondary school classrooms are characterised by less personal and positive teacher-student relationships (see Eccles & Midgley, 1989). In one study, for example, both students and observers rated secondary school math teachers as less friendly, less supportive, and less caring than the teachers these students had one year
earlier in primary school (Feldlaufer, Midgley, & Eccles, 1988). In addition, the seventh-grade teachers in this study also reported that they trusted the students less than did the students’ sixth grade teachers. Perhaps such a shift in the quality of student-teacher relationships means that students have little choice but to turn to elsewhere for support.

During the first weeks of school, close ties with peers may be an important source of support (Ladd, 1990). However, for many students, disruptions in peer networks occur when they move to secondary school. Many primary school friends may attend different secondary schools (Berndt, 1989). Not surprisingly, adolescents are upset by the prospect of losing close friends. Berndt and Hawkins (1985) found that, in speculation of entry to secondary school, sixth graders were most concerned about changes in their peer group. Moreover, research has indicated that their concerns are warranted as the entire first year of secondary school has been demonstrated to be a period of considerable fluctuation in friendships (Berndt & Hawkins, 1985).

**Home Settings Affecting Transition**

Previous research suggests that support from parents may also be important during the adjustment to secondary school. Specific familial characteristics such as parental warmth, intimacy, and communication have been associated with children’s well-being, despite exposure to stress (Rutter, 1983; Werner & Smith, 1992). However, for many students, this source of support may be lacking. Nowadays, both parents often work full-time and are required to work longer hours, as well as to travel further to places of work. At the same time, people are increasingly being captivated by a range of time-consuming technologies, such as television, video and the internet. Undoubtedly, these changes have helped create barriers within and across families (Charlton, 1998). By way of illustration, recent research in the United States showed that, on average, parents spend fewer than two minutes daily interacting with their children (see Charlton, 1998).

In addition, family stability appears to be increasingly weakening over recent years. Recent statistics indicates that in Australia 32 percent of marriages end in divorce, leaving almost 20 percent of all children aged 17 and under living in one-parent families (Australian Bureau of Statistics, 2001a). As pointed out by
Hetherington and Jodl (1994), divorce should not be viewed as a single static life event but rather as part of a complex series of transitions and family reorganisations that modify the lives and development of children. Marital transitions, such as separation, divorce, and remarriage, are generally associated with multiple changes, such as the loss of a parent, reduced income, changes in maternal employment and geographical relocation. Previous research has suggested that in the aftermath of divorce, parents tend to be preoccupied with their own problems which decreases the amount of support they are able to give their children (Wallerstein, 1983). Many custodial parents become overloaded and socially isolated as they attempt to juggle household, childcare, and financial responsibilities that were previously dealt with by two parents (Hetherington & Stanley-Hagan, 1997). In consequence, it does not seem surprising that studies have concluded that custodial parents can become erratic, uncommunicative, and less supportive in dealing with their children (Hetherington, Cox, & Cox, 1982).

**Summary: School and Home Settings Affecting Transition**

In summary, a significant portion of students facing the pressures of adolescence and the transition to secondary school may not be able to gain access to the guidance and support that they need. Freed from the dependency of childhood, but not yet able to find their own path to adulthood, it appears that adolescents may feel a desperate sense of isolation and uncertainty. The increasing divorce rate, number of single parents, and families with two working parents have led to a diminution of the family from its role in providing support to children and thus, in many cases, this responsibility has been handed over to schools. In recent times, schools have increasingly acknowledged their obligation to create an atmosphere that is conducive to good mental health, in order to manage those emotional and social problems that can be helped within school, as well as teach and model a range of positive ways of handling emotions (Burns & Hickie, 2002; Wassef et al., 1995). However, as noted previously, teachers may be limited in their ability to achieve these aims, particularly at the beginning of the school year. Despite these limitations, a number of schools have sought to implement interventions to improve the educational experiences and support structures for adolescent students in the early
years of secondary school. Key features of these programs are examined in the following section.

**Programs Designed to Ease the Transition**

*Education is to mould the human being for ongoing change and even for the eventual crisis which might arise as a result of the transition.*

*Miguel Angel Escotet, 1996*

Due to the multitude of problems faced by youngsters during adolescence and the transition to high school, researchers and practitioners have called for strategies to help students overcome adjustment difficulties. This is particularly important because early adolescence has been found to be a critical “turning point” for many youth, one of the “last real opportunities to affect their educational and personal trajectory” (Jackson & Hornbeck, 1989, p. 831). In light of this evidence, educators have intensified their efforts to create schools that are responsive to adolescent development and make students feel a part of a supportive and caring community (Clark & Clark, 1993; Mac Iver & Epstein, 1993). As part of their effort to achieve this objective, several schools have implemented orientation, support, or skills training programs during the early adolescent years.

**Orientation Programs**

Schools vary greatly in their practices to ease the transition from primary to secondary school. However, many secondary schools employ some form of orientation or introductory program, the most common of which takes the form of an information session (MacIver & Epstein, 1993). Orientation programs are generally designed to provide incoming students with information and expectations regarding the secondary school and in consequence, dispel any myths and anxieties about the new environment. Although research in this area is negligible, there is evidence to suggest that orientation programs provide some benefits to new school students (Bogat, Jones, & Jason, 1980; Ferguson & Bulach, 1997; Sloan, Jason, & Bogat, 1984). For example, Bogat et al. (1980) evaluated the effects of a two-day orientation program designed to smooth the transition to a new primary school after a forced school closure. Essentially, the program involved peer-led discussions focusing on
school rules, inter-school activities, school personnel, as well as their feelings about transferring. Thirteen of the transfer students who participated in the program were compared with 38 students currently enrolled at the primary school (control group 1) and four transfer students who did not participate in the orientation program (control group 2). The researchers found that program participants scored significantly higher than both of the control groups in terms of self-esteem related to peer relationships, knowledge of school rules, and ratings by teachers of their conduct at school.

Ferguson and Bulach (1997) evaluated the effects of an orientation program on students’ social adjustment levels. This program was designed to ease the transition by inviting primary school students to spend a day at their new secondary school. Participants in the program accompanied or “shadowed” secondary school students to familiarise themselves with the school surroundings and schedule. The program evaluation compared 54 program participants with 54 non-participants. The control group was matched on the basis of gender, scores on the Iowa Test of Basic Skills, and age. Ferguson and Bulach found that participants in the Shadow program reported greater knowledge of teacher expectations, fewer problems finding needed facilities, and lower anxiety levels than students who did not participate.

Extended Programs

Orientation programs are intended to tackle the problems of school transitions by getting students over the initial hurdles of adjustment. Various other programs have been created to provide ongoing help to students by, for example, providing a base of support for students and reducing the complexity of the school setting. The School Transition Environment Program (STEP), designed by Felner and his colleagues (Felner et al., 1982; Felner & Adan, 1988), is one such program. The primary components of this program involve a redefinition of the role of homeroom teachers and a reduction in the degree of flux in the school setting. The role of the homeroom teacher is extended to include guidance and counselling responsibilities and program participants are placed together in several of their classes. In their evaluation of STEP, Felner et al. randomly selected 65 students who were entering a large American high school for participation in the program. Participants were matched by gender, age, and ethnic background with 120 non-participating controls. Felner et al. reported that students involved in the program showed significantly
better attendance records, grade point averages, and more stable self-concepts than control students. Moreover, a long-term follow up of this study found that students who were involved in the program continued to show significantly higher grades and fewer absences in the first two years of secondary school (Felner & Adan). This research also revealed that program participants had markedly lower school dropout rates than controls. In the follow-up study, the dropout rate for participants was twenty-one percent compared to a dropout rate of forty-three percent for non-participants (Felner & Adan).

**Skills Training**

Another approach taken by schools is to implement programs that are designed to enhance students’ coping skills. Many of these programs are offered to select groups of students who are most at risk of experiencing difficulty during secondary school. For example, Wassef, Mason, Lassiter, VanHaalen and Ingham (1998) designed the Student Assistance Program to specifically target students who were experiencing emotional distress or behaviour problems. Participants in the program attended weekly group meetings that revolved around issues, such as the consequences of substance use and how to remain abstinent, parental divorce, and depression. The groups were facilitated by two adult volunteers and the program ran for one year. Research based upon 76 program participants found significant improvements in interpersonal, internal, and school domains. Furthermore, two-thirds of the alcohol and substance users reported reducing their intake or abstaining (Wassef et al., 1998).

Other skills-based training programs have also been implemented in schools to (a) promote positive peer interactions among disliked students and (b) facilitate pro-social skills and appropriate expressions of anger among students with behaviour disorders (e.g., Bierman, 1986; Presley & Hughes, 2000; Tamaki, 1994). For example, Bierman (1986) investigated the effectiveness of a social skills intervention designed to facilitate peer acceptance among disliked students. In this study, 27 unpopular students who showed few conversational skills during pre-treatment observations engaged in cooperative activities with two socially accepted classmates for ten half-hour sessions. Half of these students received coaching in conversational skills, while the other half received non-specific adult support. The results of this
study showed that students who received social skills training displayed more conversational skills and received more positive peer support during treatment than students who did not receive coaching.

**Peer Support Programs**

Many forms of peer support initiatives have been implemented in Australian schools and given a myriad of different titles such as peer education, peer mentoring, buddy programs, peer support groups, peer counselling, peer mediation, and peer tutoring. At times, each of these terms has been used in different ways. However, on the whole, these programs have been designed to encourage students to help one another. In all instances, someone has been given, and often trained to undertake, a defined task of offering a learning experience to an individual or a group. More often than not, the leaders or tutors were required to listen to, and sometimes provide support for, their peers (Charlton, 1998). The peer support provided has varied in form and includes the provision of academic support in classrooms, help with school transfer, playground supervision, and resolve concerns such as bullying.

Very few studies have critically analysed the benefits of peer intervention strategies, however of those studies that have, the results are promising. For example, Kotloff, Roaf, and Ma (1993) examined five programs that use peer support groups as the key element of their intervention efforts in reducing the incidence of substance abuse, school failure, and other problems of adolescence. Of these programs, one was peer facilitated and four were adult facilitated; two were school-based and three were community-based. These authors had little solid evidence to judge the effectiveness of the five programs, because they did not collect longitudinal data to facilitate tracking program effects. Nevertheless, their interviews with program staff and participants uncovered some of the potential benefits of these programs. Kotloff et al. (1993) found that the support groups provided participants with a source of social and psychological support that may be otherwise lacking in their lives. When asked to consider program benefits, there was consensus among participants and staff that the participants gained a sense of acceptance and understanding from their groups. Several of the participants and facilitators also indicated that the support groups provided them with a sense of social connection and self-worth, and improved their coping skills. Furthermore, from their observations of the peer versus
adult facilitators, Kotloff et al. (1993) concluded that facilitators who are close to youth, in terms of age, cultural background, or life experiences, may be more effective than professional counsellors. This suggests that the power of the facilitator to influence the adolescent might be maximised if the adolescent perceives the leaders as people that they can relate to.

The Peer Group Connection (PGC) was one peer support initiative, included in the Kotloff et al. (1993) study, designed to assist students with the transition to secondary school. The PGC began in 1985 in Trenton Central High School in New Jersey. Senior students are required to attend a yearlong course to develop their leadership skills so that they could work competently and confidently with a group of younger students. The following year, a team of two of these student leaders meet weekly with 10 to 15 new secondary school students for a 40 to 50 minute class period during regular school hours. Although this program has not been studied comprehensively, there is evidence to suggest that the PGC can help schools change in positive, constructive ways as well as help adolescents cope with the personal changes and challenges in their lives (Kotloff et al., 1993; Powell, 1993). According to an evaluation by the Educational Testing Service in New Jersey, schools that establish PGC can expect a significant reduction in the number and severity of disciplinary incidents, and they can anticipate an improvement in attendance and in academic performance (see Powell, 1993).

Peer support strategies have also been specifically used as a means of counteracting aggressive behaviour, decelerating anger arousal, and reducing bullying in secondary schools. Although empirical studies on the efficacy of these programs are rare, there is evidence to suggest that peer support interventions may be effective in decreasing the negative effects of bullying for victims. For example, Naylor and Cowie (1999) examined peer support strategies specifically designed to challenge bullying in 51 U.K. secondary schools and colleges. Teachers and students involved in the program completed a survey on the effectiveness of the support system employed by their school. The vast majority of the programs under analysis were befriending schemes or counselling-based schemes. Befriending systems involve the assignment of a student or students to “buddy” or “befriend” a peer. Counselling-based methods extend the befriending approach into interventions that are based more overtly on a counselling model, and take place in designated rooms,
usually through a system of appointments and over a period of time (for a detailed guide see Cowie, 2004; Cowie & Wallace, 2000). Naylor and Cowie (1999) found that peer support systems are generally effective in reducing the negative effects of bullying for victims and making it more acceptable for victims to report bullying incidences. Many victims reported that the program provided them with support and had given them the strength to overcome their bullying problems.

However, research conducted to date indicates that peer support systems may be limited in their ability to bring about a decline in bullying behaviour (Cowie & Olafsson, 2000; Naylor & Cowie, 1999; Peterson & Rigby, 1999; Wilson, Lipsey, & Derzon, 2003). The meta-analysis of Wilson et al. (2003) reviewed 177 primary programs designed to prevent behavioural and social problems in children and adolescents. They identified three peer-led interventions where students served as mediators for other students experiencing peer conflicts. The results of this study indicated that these programs were not effective in preventing or reducing aggressive behaviours. However, Wilson et al. noted that because so few studies are available, it is too early to disregard these programs.

Comparatively more research has been conducted on peer tutoring programs. Over the past decade, peer tutoring has been increasingly adopted in both primary and secondary schools. Peer tutoring is an educational strategy used to facilitate students’ skills in reading or other curriculum areas (see Cowie & Wallace, 2000). The Chance to Succeed Program is one such intervention in which preadolescent students are paired with older students who have been carefully selected and trained for two weeks to be tutors (see Berry, 2002). The tutors guide the younger students through their homework and help them with their reading during for one hour after school, four days a week. Research on peer tutoring interventions has consistently found that there are positive cognitive and social benefits for those being tutored. For example, Cohen, Kulik, and Kulik’s (1982) meta-analysis of findings from 65 independent evaluations of school peer tutoring programs showed that these programs have positive effects on the academic performance and attitudes of those who receive peer tutoring. Peer-tutored students outperformed control students on examinations and they also developed positive attitudes toward the subject matter covered in the tutorial program.
Summary: Programs Designed to Ease the Transition

A variety of program models has been designed to facilitate students’ adjustment to adolescence and secondary school, such as orientation programs, skills training programs and peer support programs. In general, these programs are designed to help students feel part of a supportive and caring community and increase their coping, social and/or academic resources. Several of these approaches are restricted to students with learning difficulties and emotional and behavioural problems, while others are designed to invoke school-wide change. To date, very few of these have been systematically evaluated or implemented on a large scale, particularly in the arena of peer support. In the following section, the potential of peer support programs in helping facilitate the transition to early adolescence is reviewed.

The Potential Power of Peer Support Programs

In recent years, peer support programs have recently been proposed as a potential solution for addressing students’ problems (Wassef et al., 1995). Given the erosion of so many traditional support structures, the notion of encouraging students to support one another appears worthwhile. As indicated in aforementioned research, some students may receive limited support from their parents, partly due to the growing divorce rate and the number of single parents, and families with two working parents. It may be the case that the school is the only setting where adolescents can now receive support and guidance (see Charlton, 1998). However, previous research indicates that there is deterioration in student-teacher relations in secondary school, as well as an increasing emphasis on competitiveness rather than group harmony (e.g., Eccles et al., 1993).

The potential of peer programs becomes even more compelling in view of the preference of adolescents to be helped and influenced by peers. As discussed previously, peer relations become increasingly important during early adolescence (Berndt, 1982). Furthermore, previous research suggests that adolescents are more likely seek help from friends than teachers and counsellors. In part, this may be due to the increase in time spent with peers. One study found that secondary school students spend twice as much of their time with peers as with parents or other adults (see Brown, 1990). During adolescence, students also become more concerned about
peer acceptance and popularity. At this time, peers become potentially powerful models for the socialisation of beliefs, behaviours, motivation, and achievement (see Ryan, 2000). As a result, adolescents’ susceptibility to peer influence increases. The media has persistently portrayed peer influence as a negative “monolithic force guiding adolescents into unhealthy and undesirable behaviour” (Brown, Dolcini, & Leventhal, 1997, p.161). In support of this contention, numerous studies have demonstrated the negative effects of peer influence on activities such as substance abuse and delinquent behaviour (e.g., Dryfoos, 1990; Coombs, Morris & Richardson; 1991; Rose, Chassin, Presson, & Sherman, 1999). However, more recently, researchers have acknowledged the potential of peer groups in bringing about positive changes (Brown, 1990; Brown et al., 1997; Clasen & Brown, 1985; Ryan, 2000; Tate, 2001). They have reported that friends may pressure adolescents to study hard, achieve good grades, and attend university.

In sum, the provision of peer support appears to have the potential to make a significant contribution in addressing students’ problems. Firstly, previous research indicates adolescents’ willingness to both provide and receive support from their peers. Secondly, there is evidence to suggest that adolescents favour utilising friends rather than adults as a source of help. Thus, given these findings, traditional mental health services may not succeed in providing effective intervention (Wassef et al., 1995). Furthermore, by failing to capitalise on the help seeking patterns of adolescents, schools may be forfeiting valuable opportunities to address students’ well-being (Charlton, 1998).

Benefits for Peer Leaders

*By learning you will teach: by teaching you will learn.*

*Latin Proverb*

In the majority of literature on peer support initiatives, the impact of the program on the participants is the key concern and the impact on the helpers or leaders is often ignored. Although some have speculated on the potential benefits of serving as a peer support leader, noting gains to self-esteem, listening skills, and pro-social attitudes (Charlton, 1998), very little empirical research has been conducted in this area. However, the work of Cowie and her colleagues (Cowie et al., 2002;
Naylor & Cowie, 1999) has suggested that peer support programs may also be of benefit to those who serve as peer support leaders. In a recent study, Cowie et al. interviewed 80 peer leaders and 34 teachers about their perceptions and experiences of the peer support program being conducted in their school. Interviews were conducted in 35 different schools and the programs included befriending, conflict resolution and counselling-based programs. Peer support leaders and teachers reported that the programs had improved the leaders’ self-confidence, gave them useful skills, enhanced their responsibility and gave them a useful opportunity to take action against bullying in their school.

The literature on peer tutoring also provides support for the notion that peer leaders benefit from their involvement in the program. Researchers have found that peer tutoring is effective in improving both tutors’ and tutees’ academic and social development (e.g., Cohen, Kulik, & Kulik, 1982; Goodlad & Hirst, 1989; Benard, 1990; Sheldon, 2001; Swengel, 1991). For example, Cohen, Kulik, and Kulik’s (1982) meta-analysis of findings from 65 independent evaluations of school tutoring programs showed that these programs had positive effects on students who served as peer tutors. Like the students they helped, the tutors gained a better understanding of and developed more positive attitudes toward the subject matter covered in the tutorial program.

Therefore, it appears that peer support interventions may also have positive benefits for those who serve as peer leaders. However, apart from research on peer tutoring, there is currently a paucity of systematic evaluations on the effects of peer support programs on those who serve as peer leaders.

**Implications for the Present Investigation**

The research reviewed above suggests that peer support programs may be of benefit to both junior secondary school students and their peer support leaders. However, large-scale studies on the effectiveness of peer support programs are currently lacking and the studies that have been conducted to date are compromised by serious methodological limitations. These limitations include anecdotal evaluations, the use of instrumentation with unsubstantiated psychometric properties, absence of control groups, as well as a deficiency of evaluation and follow-up. Kotloff et al. (1993) expressed concern over the quality of evaluative studies on peer
support interventions, arguing that there is little hard data with which to judge the effectiveness of peer support as previous research has not collected “the kinds of systematic data that lend themselves to tracking program effects” (p. 33).

A common method used in evaluating peer support interventions has been the administration of surveys or interviews at the conclusion of the programs, with no control group or baseline data against which to compare the reported effects. The study of Kaye and Webb (1996) is one such example in which Year 7 students were asked to complete questionnaires on only one occasion—at the completion of the peer support program. In this study, 96 percent of Year 7 students reported that the intervention had helped them settle into secondary school. Although these results appear impressive, researchers have suggested that testing conducted immediately after an intervention can distort students’ responses. Marsh, Richards and Barnes (1986) discussed the phenomenon of “post-group euphoria” (temporary elation at the end of an intervention), which can inflate post-intervention test scores. As a result, Marsh et al. (1986) stressed the imperative of collecting later follow-up data to ensure that the initial effects of the program have been maintained over time.

Previous research on peer support has also frequently used instrumentation having unsubstantiated psychometric properties to assess changes in students’ perceptions over time. Many researchers have employed unpublished instrumentation in their research and have failed to report any information on their psychometric properties. Poor quality instrumentation has been proposed as a major cause of disappointing or inconsistent results found in previous intervention research. This has been argued to be the case particularly in the arena of self-concept. For example, Marsh and Craven (1997) demonstrated that intervention research based on ill-defined measures of self-concept rather than psychometrically sound multidimensional instruments is more likely to produce non-significant effects. These researchers have also highlighted the importance of adopting measures that include scales that are specifically relevant to the goals of the intervention. As asserted by Marsh and Craven, “If none of the facets of self-concept used in an evaluation match the intended outcomes of the intervention, then significant effects are unlikely to be found” (p. 180). They argued that this is a particularly serious problem in studies that rely on global measures of self-concept, using what is termed “the throw it in and see what happens approach”.

34
Thus, in order to avoid the limitations of previous research, the present investigation was designed to incorporate (a) a longitudinal quasi-experimental design with control groups and baseline data against which to compare the effects, (b) a thorough examination of the psychometric properties of the instrumentation employed to test the intervention effects, and (c) instrumentation where scales are matched to the objectives of the program.

Summary

In this chapter, previous research relevant to the current investigation has been reviewed. These include studies to substantiate the view that the transition to adolescence and secondary school is problematic for a considerable number of adolescents and identifies key factors and programs that may serve to ease this transition. The chapter demonstrates that there is a paucity of well-designed research on the effectiveness of peer support interventions that may be an especially valuable strategy in addressing students' problems. The limitations of previous research in the area of peer support were reviewed, particularly in relation to the need for researchers to select appropriate instrumentation and apply a sound research design. The following chapter provides a detailed description of the peer support intervention, on which the present investigation is based.
CHAPTER 3

PROGRAM BACKGROUND AND DESCRIPTION

Introduction

The primary purpose of the present investigation is to empirically evaluate the effectiveness, strengths and limitations of a widely-used peer support program on both seventh grade students and on their senior peer support leaders. The program selected for the present investigation was designed by the Peer Support Foundation to assist students through the instability of adolescence and the transition to secondary school. Moreover, the acquired skills and values developed through the program are intended to help students positively face problems that they will undoubtedly encounter in their life's journey ahead. This chapter begins with an outline of the origins of the Peer Support Foundation and is followed by a detailed description of the characteristics of its secondary school program. A thorough outline of the content and activities of each program session is provided, as well as the key factors identified by the Peer Support Foundation for successful intervention. The key factors relate to the roles and training of school staff, plus the selection, training and supervision of the peer support leaders.

Origins of the Peer Support Foundation

The Peer Support Program was first established in 1971 in response to community need. Following the death of a young student from a drug overdose at a Sydney secondary school, recognition of the need to set up programs designed to assist youngsters with drug-related issues became paramount. Elizabeth Campbell, a health education officer, developed a program to enhance the skills and values vital to students' wellbeing. Her program began using cross-age peer groups to deliver the program because she believed that the best people to positively influence and support young people are their peers.

As the Peer Support Program developed, it became apparent that a more formal structure was required to implement the program in schools and so the Peer Support Foundation was established in 1983. The Foundation worked closely with
the Department of Education and Department of Health to ensure that the program integrated into the school curriculum and educational initiatives.

In 1984, the Peer Support Foundation's first program for secondary schools was introduced. The primary schools' program soon followed this in 1989. At the beginning of 1984, six secondary schools had adopted the program. By the end of the year, this had grown to sixty schools. In New South Wales today, there are more than 1,600 primary and secondary schools from the government and non-government sectors adopting the Peer Support Foundation's programs. Once the programs were established in New South Wales, the Peer Support Foundation began to support the delivery of peer support programs in other states of Australia, including Queensland and the Australian Capital Territory. The Foundation also provides information and support to schools who have adopted the model in New Zealand, Singapore and Scotland.

The Peer Support Foundation has recognised that, in order to keep their programs interesting and relevant, their programs must continue to develop and improve. The focus of the present research study is on the secondary school Core Peer Support Program for seventh grade students, which was revised in 2001. This specific program will be described in detail in the following sections.

**Characteristics of the Secondary School Peer Support Program**

**Overview of the Secondary School Peer Support Program**

The Core Peer Support Program is designed to train senior secondary school students to work regularly with small groups of seventh grade students. The seniors are responsible for leading a group of younger students through the program content and activities. Broadly, program content delivered by peers addresses goal setting, group decision making, problem solving, and the development of support networks. The program is designed to be experiential and to encourage as much participation as possible.

The program is designed to be run by a team of enthusiastic and well-organised staff members. Each staff member is expected to undergo training so that they are thoroughly informed of the structure of the program and their role in its implementation. The student leaders must have applied for the position and are
carefully selected by the staff involved. The leaders undergo an intensive two-day course to prepare them for their role and are intended to be supported at every stage through briefing and debriefing sessions conducted by staff. The Peer Support Foundation encourages schools to involve parents in the program by providing them with ongoing information. In this way, parents can enjoy and build on their children’s peer support experiences.

Goals and Objectives of the Program

The overarching aim of the Peer Support Program is to “foster the physical, social and mental well-being of young people” (Peer Support Foundation, 2001, p. 1). It aims to do this by developing crucial values, skills, and attitudes that will not only assist students through the transition to adolescence but also throughout their lives. Specifically, the Peer Support Foundation claims that the program assists students by enhancing:

School competence. The Foundation advocates that their secondary school program has a “cross-curricula focus” (p. 1), and is particularly relevant to the following key learning areas: English; Personal Development, Health and Physical Education (PDHPE); and Human Society and its Environment (HSIE). They propose that the program contributes to competence in these areas by encouraging students to share their ideas, feelings and information with others, listen critically and offer constructive responses to others, as well as respect different viewpoints.

School citizenship. The peer support program was designed to develop skills for “positive, socially responsible participation in the school community” (Peer Support Foundation, 2001, p. 6). Students are encouraged to develop concern for student welfare, to accept cultural diversity within their school community and choose positive patterns of behaviour. In this way, the program intends to enhance responsible citizenship among students and create a secure and caring ethos within the school environment.

Sense of self. The Foundation defines sense of self as what students think, feel and believe about themselves. Sense of self is dynamic, formed by the student, their relationships, interactions and experiences. The program aims to develop students’ sense of self by encouraging them to accept themselves as they grow and change, value themselves as important members of various groups, express a realistic
perception of their personal capabilities, and make positive contributions to group activities.

**Connectedness.** The Foundation describes connectedness as a feeling of belonging, which develops through relationships with individuals and groups within their social environment. Individuals who have a strong sense of connectedness are considered to take more positive risks in and responsibility for establishing strong relationships. The program is designed to promote connectedness by encouraging students to share their ideas and feelings with others, be sensitive to the need for shared responsibility and decision making, negotiate with others and respect different viewpoints, as well as make a commitment to developing and maintaining positive relationships.

**Resourcefulness.** Building resourcefulness involves the empowerment of the individual to be positive, proactive and resilient in dealing with life experiences. The Foundation portrays resourceful individuals as having the ability to reflect on and learn from their experiences, as well as creatively turning challenges into opportunities for continued growth and learning. The program teaches students how to cope with problems; to be adaptable in their thinking and ideas; to cope effectively with change; and to be more organised and less stressed at school.

**Sense of possibility.** A sense of possibility involves an awareness and belief that positive outcomes can be achieved in the future. The program aims to enhance students’ expectancies for success so that they will persevere even when progress in dealing with a problem or attainment of a goal is slow and difficult.

As can be seen, the Peer Support Program is designed to foster the promotion of multiple desirable psychological outcomes. By enhancing school competence, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility, the Foundation predicts that students will become young people who can “take responsibility for their own well-being”, as well as “deal positively, proactively and resiliently will their life experiences” (Peer Support Foundation, 2001, p.i).

**Detailed Description of the Program**

The secondary school program consists of a two modules: the Orientation module and the Positive Action module. The Peer Support Foundation has compiled
a manual for the secondary school Core Program, outlining in detail the session plans (Peer Support Foundation, 2001). The aims of each session are clearly defined, guidance is given as to what preparation and materials may be needed, and a thorough format for the activities is given with suggested timings.

Each session is designed to run for forty-five minutes and the Peer Support Foundation recommends that sessions should take place once per week. The Peer Leaders, with the support of a supervising teacher, facilitate each session. Each group consists of eight to ten Year 7 students and two peer leaders. Once the program commences students are not permitted to change groups as the Foundation considers that this interferes with the collaborative process. Changing students from one group to another is also thought by the Foundation to encourage leaders to think that they have failed and creates poor behavioural expectations in the group the student joins.

Orientation Module

The purpose of the Orientation module is to introduce Year 7 students to secondary school. As discussed in the previous chapter, for many students, leaving the security of primary school is a difficult time as they move to a larger, more departmentalised setting, with different sets of teachers and peers in each class daily. This component of the program aims to help students “to achieve a smooth transition into their new environment and to work together supporting each other to develop a positive attitude toward high school” (Peer Support Foundation, 2001, p. 5). The Orientation module consists of four sessions, each of which is outlined below.

Session one. The first session begins with an activity designed to act as an “icebreaker” and in a relaxed and informal way enables the group members get to know one another. Students are asked to think about their favourite hobby/sport, and then write down three clues to identify their favourite hobby/sport. They are then asked to pair up and read out their clues to their partners, who attempt to deduce what the hobby/sport is. The pairs are given a few minutes to talk so that they get to know one another better. Each student is then asked to introduce his or her partner and hobby/sport to the group.

Following the introductions, students are asked to formulate a group agreement. The purpose of this task is for students to work together to compile a set of rules which will enable all students to feel comfortable with their group members
and will facilitate behaviour management. Some examples of rules are to respect everyone, take turns, and try to be on time. The leaders then ask students to write the agreed upon rules in their books and sign them to illustrate their commitment to the group.

The next activity is designed to make students more familiar with the new school environment. Leaders may choose to take students on a tour through the school to show them the location of school amenities, such as the library, toilet blocks, main office, and canteen. The leaders ask students draw a map as they go, which could later be glued into their books or diaries.

Following the school tour, leaders help students understand their school timetable. The latter can be daunting and confusing to the new students as this will probably be their first time experiencing a set subject timetable, changing rooms between subjects, and being taught different subjects by various teachers. The leaders are asked to recommend to students that they keep three copies of their timetable: one in their diary that they bring to school every day, one at home in the workspace they use for study, and one in their lockers that they can use if they forget their diaries.

For the final activity, group members are asked to brainstorm some ideas on how to survive the first few weeks of high school. The leaders suggest that they ask other Year 7 students, their peer leaders, or teachers for assistance. Leaders advise the students where to find or contact them should they wish to speak to them between sessions. The leaders conclude the session by wishing the students well until the next session.

**Session two.** The first activities of the second session are designed to increase students’ understanding of the school rules, staff, and sports activities. For the first activity, students play a game where the leaders read out clues to identify a specific teacher and the seventh graders are asked in turn who they think the teacher is (see Appendix A-1 for example clues). During the next part of the session, the leaders go through the school rules and sort out any misunderstandings the Year 7 students may have. Following this discussion, students play another game to help them learn more about their school. To play this game, a student picks up a card from a pile placed in the middle of the group and reads out the question. Examples of questions are ‘What
do I do to order lunch?” and “What sports activities are there?” (see Appendix A-2 for additional examples). The group then discusses an answer. When the group is satisfied with the answer, the next student picks up a card and reads out the question. After the group has completed the game, the leaders ask the seventh graders who they could ask for help at school if it were needed. The students are asked to share their answers with the group. The leaders may offer some suggestions to add to the discussion.

The second part of the session aims to help students with time management. The Year 7 students are asked to complete a time map indicating how much time they spend each day on different activities (e.g., sleeping, eating, at school, at sport/music or other after school commitments, watching TV, playing on the computer, and doing homework/study) (see Appendix A-3). Once all students have completed their time map, the leaders facilitate discussion by asking students a series of questions (e.g., “What do you spend most of your daylight hours doing?”,” “Which activity surprised you the most because of the amount of time spent?”, and “How much time do you spend doing study/homework compared to TV”? ). Following the group discussion, leaders hand out an information sheet outlining some helpful hints in regards to managing time and tasks (see Appendix A-4). Each student is asked to read out one helpful hint to the group. The group may discuss other hints that could be added to the list. The students are then asked to glue the sheet into their book.

**Session three.** The session begins with two activities designed to explore strategies on how to deal with changes in friendships. For the first activity, leaders read out a series of scenarios to the group (see Appendix A-5). The group is divided into pairs. Each pair chooses one of the scenarios and answers the questions on the activity sheets. After each pair presents its answers to the group, the leaders ask students the following questions: “What are some of the things we do that hurt or break friendships?”, “What can we do to improve a friendship that is in trouble?”, and “How can you use some of the strategies, mentioned by the group, in dealing with friendship problems?”. Student responses are listed on a large piece of paper.

The second activity involves leaders reading out a story about two close friends who did not spend much time together after the start of the seventh grade because they attended different schools and made new friends (see Appendix A-6). The story demonstrates that even when ending a friendship, it can be done in a
positive way, when both people can be listened to and interact with each other without harsh judgments and angry words. The leaders promote group discussion by asking how they can use this information in their lives.

Following the discussion, the group members are asked to share some of their experiences about being in secondary school. The leaders generate group discussion by asking them to think of some of the positive aspects about being in high school, some of the difficulties they may still be experiencing, as well as how they might be able to address these problems. The leaders then help the students with anything they still do not understand about their new school.

The final activity is designed to organise students to work together as a team to construct an object (see Appendix A-7). First, the students are asked to work together in pairs to construct one part of the object. The pairs need to work together to decide upon the best materials to use. The students are then brought together and asked to put the object together. After the object has been constructed, the leaders ask the students “What did your pair do to construct your part of the object?”  “As a team how did you work together to construct the final object?”  and “What else could you have done to make the activity easier?”

Session four. The fourth session begins with a trivia game that tests students’ knowledge of secondary school. Quiz cards are placed in the middle of the group. One of the leaders reads out the question, and a student is asked to respond. Example questions include “What do I do if I am late to school?” and “Who is the Year 7 Coordinator and where can I find him/her?” (see Appendix A-8 for additional examples). If students answer the question correctly, they get two points. On the other hand, if they do not know the answer or get it wrong, they can ask for a volunteer. Volunteers get one point if they answer correctly. When all the questions have been asked, the scores are tallied to see who knows the most about their school.

For the next task, the leaders ask the group to generate some ideas for activities that they could run at school. It may be a one-off activity or something that is ongoing throughout the year, and may require further meetings of the peer support group. The group members brainstorm some ideas and one of the leaders lists them on a large sheet of paper. The students are asked to select two of the ideas and formulate a detailed proposal including details on where and when the activity would

43
take place, who it might involve, what they would need, and what it might cost. It is also suggested that this proposal could then be given to the Year Coordinator or school executive for approval.

The following activities are some examples of the activities that may be selected:

1. Choose a charity, such as Planet Ark or Amnesty International, and conduct some fundraising activities (e.g., mufti day, car wash).

2. Organise a walk-a-thon or sports competition, which would involve students from various year groups and teachers.

3. Establish peer tutoring to involve tenth or eleventh grade students.

The activities should be fun and promote interaction with other year groups. This would enhance a sense of belonging for the seventh grade students and encourage continued connection with other students in the school.

The Orientation module ends with a celebration where the leaders emphasise the value of the contribution the students have made to the group and recognition of what the group, as a whole, has achieved in the time. Each peer support group may have its own celebration or all the groups may combine together. In regards to the latter, the Peer Support Foundation suggests group activities, such as a picnic or sausage sizzle followed by a large group activity, such as touch football or a tug of war.

**Positive Action Module**

The purpose of the second module, Positive Action, is to provide students with the skills required to approach life with a positive attitude, to be proactive in dealing with challenges, and to develop resilience to deal with difficult experiences. This module can be commenced straight after the first module. Positive Action consists of eight sessions, each of which is described in detail below.

**Session one.** The leaders begin by welcoming students back to peer support. The first activity is designed to help students know more about each of the group members. The leaders split the students into pairs and ask them to tell each other about the most interesting or funny event that has ever happened to them. Student are
then asked to introduce their partners to the group and tell everyone the story they have just been told. Following the introductions, the leaders remind students of the group agreement that was formulated earlier in the year.

For the second activity, students play a communication game. The leaders split the students into two groups and read out the rules of the game. A student picks up a card, which has an emotion, such as pain, anger or surprise, written on it (see Appendix B-1). The student uses non-verbal communication, such as drawing, making a facial expression, or gesturing, so that the group can guess the word on the card. The student who first guesses the correct answer draws the next card. The game continues until everyone has had a turn. The leaders formulate a discussion on the ways in which the group communicated during the game. The group discusses some of the advantages in using nonverbal communication (e.g., watching someone’s body language carefully helps you to figure out what the person might be thinking and feeling), some of the frustrations for the student with the card, and the reasons why the group may or may not have followed the group agreement during the game.

The next activity is designed to help students understand the specific skills and abilities that each student brings to the group. The leaders inform students that hypothetically the group will be forming a band and each student has a specific role to play. Each student is asked to choose a card that indicates the role he or she will play (e.g., lead singer, drummer or songwriter) (see Appendix B-2). The leaders request suggestions for what might need to be done to form a successful band, which are listed on a large sheet of paper. The group might need to work out a name for the band, the type of music it might play, what sorts of instruments are required, and what they will wear. The leaders ask the group how the requirements of their roles differ now that they are part of a band and how the band can work well as a team. Leaders suggest to students that the band will succeed if everyone knows what they have to do and tries to do it well. The group participants then discuss their roles in the peer support group and what they need to do to help the group work well as a team. The leaders conclude the session by asking students to try to work as a helpful team member over the next few weeks and thank them for their participation.

**Session two.** The leaders explain to year 7 students that over the next seven sessions they will be learning how to develop a habit of expecting that things will turn out well and that this is termed ‘Optimism’. The purpose of the first part of the
session is to explore how peoples’ feelings affect their choice of behaviour. The leaders begin by explaining that if we feel “down”, we often expect the worst to happen. However, if we expect the best, we can make that happen too. For the first activity, students are divided into three groups and given a copy of a cartoon, as well as three cards showing feelings (e.g., excited, confident, miserable) (see Appendix B-3). In their groups, students are asked what behaviours the characters on the cartoon would choose according to the feelings on the cards given to their group. Together, the group then discusses what the positive and negative feelings may have led the characters to think and do. Following this discussion, students brainstorm a list of positive messages that they can remember when times are tough and these are listed on a large sheet of paper. For example, “This only affects a small part of my life” and “Time will pass and things will get better”. The leaders suggest that students copy three of their favourite messages into their book.

The second part of the session looks at how people choose their behaviour to satisfy their needs. The basic needs are read out and defined to the group. The leaders then ask for examples of behaviour that fits each of the five needs. For example, to satisfy the need of love and belonging students may need to spend time with friends. Following this discussion, the group is asked to look at the activity sheet (see Appendix B-4) and discuss what might happen if they choose the behaviours presented next to each need. Some of these behaviours are positive (e.g., I am hungry so I ask a friend to share their food) while others are negative (e.g., I am really hungry so I steal a chocolate bar). The leaders finish off the session by emphasising that we are all responsible for our own behaviour and asserting the following to message to students: “Before the next session, take time to think before you act. Ask yourself if you are making the best choice to meet your needs and whether you are stopping someone else from meeting theirs”.

**Session three.** The first activity is designed to demonstrate how attitudes can affect behaviour. To begin with, leaders explain what it means to have an optimistic or pessimistic attitude. For example, individuals with an optimistic attitude might credit a team win to great teamwork (“It feels great to be part of a winning team. I contributed to our win”). Alternatively, people with a pessimistic attitude might think that the win was due to luck or the actions of others, rather than their own abilities and efforts (“The other team was really hopeless. I played badly. Lucky the rest of
my team are good players") (see Appendix B-5 for definitions of what and further examples). The leaders then divide the students into three groups and ask them firstly, to think of an example of a positive experience and secondly, talk about how the thoughts of a person with an optimistic attitude would compare with those of a person with a pessimistic attitude. The students write their responses on the activity sheet provided. The activity is then repeated, but this time students are asked to choose an example of a negative experience. The groups are then brought together to share their examples. The leaders finish off the activity by asking students “How can a pessimistic attitude affect our choice of behaviour?” and “How can an optimistic attitude affect our choice of behaviour?”. Students are asked to glue the activity sheet into their books.

The next activity is intended to help students identify optimistic attitudes that will help them make positive choices in their lives. The students are divided into the same three groups as before. The leaders ask students to use the word “optimism” as an acrostic base and choose an optimistic attitude for each letter of the word and write these in their books. The leaders then ask the groups to choose three attitudes they can practice on a regular basis. When each group has finished, they are brought back together and asked to share their three selected attitudes with the group. The leaders suggest that students add different ones to the lists that they already have. After each group has presented their attitudes, the leaders hand out a ballot paper, asking students to choose their three favourites, writing them in order of preference from one to three. The leaders tally the ballot papers and announce the result. The group then discusses how they can practice these three attitudes when choosing their behaviour, how expecting the best can affect their behaviour, and how they can make having an optimistic attitude become a habit.

For the final activity, each of the three groups is asked to choose one of the optimistic attitudes from the previous activity and create a poster, which will be displayed in the classroom or around the school. The students are given A3 paper, coloured pencils and scissors. After students have completed their poster, the leaders ask students “What effect will positive messages around the school have?” and “What does it feel like to be around optimistic people?”. The leaders conclude the session by suggesting that they practice their three favourite optimistic attitudes.
Session four. During this session, the leaders teach the seventh graders some skills to help them cope with difficult or stressful situations. For the first activity, leaders give each student part of a story to read to the group (see Appendix B-6). The group then discusses how the people in the story are feeling and what the people in the story might choose to do if they have an optimistic attitude. Following the discussion, the leaders ask, "What do most of us mean when we say we are stressed?", "How can we manage stress?", and "Why is it important for us to manage stress?". Some of the strategies the leaders could recommend in managing stress are to talk to a friend, learn to relax, set realistic and achievable goals, and to try to look for the funny side of a stressful situation. The leaders finish the activity by emphasising to students that having an optimistic attitude helps us cope in difficult situations.

For the next activity, the leaders divide the students into three groups and ask them to think about and discuss stressful situations that a seventh grader may have to deal with. The peer leaders may give a couple of examples, such as starting a new school without primary school friends, dealing with lots of new teachers, and wanting to do well in a new school. They are asked to emphasise that not all people find the same situations stressful. Some may find them challenging. Following the small group discussion, the leaders bring everyone back together and invite students to share their situations.

The students are then divided into the same three groups as before. Each group chooses one of the situations already discussed and answers five questions on an activity sheet (refer to Appendix B-7). Once each group has completed answering the questions, the leaders bring everyone together to share responses. The leaders formulate a group discussion by asking "What are some of the behaviours we choose when we are feeling stressed?", "How can an optimistic attitude help us to deal with stress and allow us to move on to other things?", "What can help us cope with a stressful situation?", and "How can we help others when they are not coping with a difficult problem?". Throughout the discussion, the leaders emphasise that people can help themselves to cope with a difficult problem by having an optimistic attitude, treating mistakes and setbacks as a natural part of learning, and turning to others for support. They also suggest that when coping with a problem, students try some of the coping strategies they have learned and to continue to try to deal with the
problem until things get better. The leaders are asked to explain that this is called "perseverance".

**Session five.** This session is designed to increase students’ understanding of and strategies to strengthen resilience. The leaders begin by explaining that resilience is about getting through the hard times. It means that you do not give up, instead you try to learn what to do in order to cope. To begin the first activity, the leaders ask students to state some examples of when people need to be resilient (e.g., falling over in front of a group of people and missing out on selection for the school band). The students are then asked to write down two examples, from their recent experience, where they might have been more resilient. After students have finished, the group discusses strategies to increase their resilience. Some examples of strategies are to have another go, avoid being negative, and consider what you can do differently next time. Following the discussion, the leaders ask students to choose one strategy that they think would have helped them with the two experiences they have written in their books and how they would plan to do it differently next time.

For the next activity, students play a game designed to help them with strategies for resilient behaviour (see Appendix B-8 for game board and cards). Before commencing, the leaders explain the rules of the game. Each student is asked to place a marker on any square of the game board. One of the students tosses the die and moves that number of spaces in any direction. The student on their left has the next turn of throwing the die, and so on. When a student lands on a space marked “BB”, they choose a game card. The student reads out the situation on the card and tries to come up with an optimistic strategy that will help them “bounce back”. The leaders would help students with a strategy if they needed it. Once all the game cards are used, the leaders organise a group discussion by asking the group which strategies they think will be able to strengthen their resilience. The leaders remind students that, regardless of the situation, they have a choice to be optimistic or not. They can learn from mistakes and setbacks and not give up. Things may not always work out exactly as they want them to, but by persevering, they have a better chance of getting over it and moving on. Finally, the leaders ask students to have a go at persevering before the next session.

**Session six.** During this session, students practice working together to solve a problem. The leaders explain to the students that for the first activity they are going
to work together as a team to survive a terrible hailstorm and flash flood. The following story is read to the group:

There are two towns, Red Gum Valley and Casuarina, on opposite sides of the river. A violent storm causes the river to swell and burst its banks on the lower side and flood Red Gum Valley. In order to survive, the residents have to get to Casuarina. Crossing the river is the problem. The bridge has been washed away, there are no boats and the current is too fast to swim across. Their only hope is to build another bridge.

The leaders tell the group that they have to make a bridge with the equipment provided (e.g., egg cartons, cereal boxes, toilet roll inserts and cans). They may place some masking tape on the ground two metres apart to mark the river bank. The students are then divided into two groups. Following the activity, the leaders ask the following questions: “How did you start the activity?” “How did student’s attitudes affect the building of the bridge?” and “How does a team work together when the task is important but difficult to do?” One of the leaders writes their answers on a large sheet of paper. The leaders finish this part of the session by emphasising that when a team has a positive approach to solving problems, success is more likely. A positive attitude and perseverance bring success.

The leaders then tell the group that they need to help the residents of Red Gum Valley rebuild their town and state that “What wasn’t washed away by the storm was badly damaged by the hail.” The leaders ask students to work in the same two groups as before. The groups need to devise a ten point “Resilience Plan” for each community. Students write this plan in their book. Some of the points might be to sort tasks into order of urgency or importance, to break large tasks into a number of smaller tasks so they can be achieved, and to organise people into groups to work on certain tasks. The leaders then bring everyone together to share their plan. They then ask students “How can you adapt your Resilience Plan to your own life?” and “What messages can we give ourselves to keep a positive attitude when we feel like giving up?” Some positive messages might be to remain calm, stay positive, and ask for help. The leaders also ask, “How can we help others who are experiencing difficulties”. Student’s answers are written on a large sheet of paper. The leaders conclude the session by suggesting that they practice taking responsibility to act
positively next time they are working with a group and that they think about what they have learned about resilience in their own lives.

**Session seven.** For the first activity, students are separated into two teams. For each team, an empty bowl is placed at one end of the room and a bowl containing objects (e.g., tennis ball, pencil case, exercise book, etc.) is placed at the other end of the room. Each team lines up between its two bowls, so that each member is close enough to pass the objects from one person to the next. The difficulty arises when students are informed that they must pass the objects to one another using plastic teaspoons or paddle pop sticks. The object continues to be passed down the line until the last student places the object in the empty bowl. If Students drop the objects they are asked to persevere until they manage to pass it to the next student. Once the teams have completed the task, the leaders bring the students together and ask the following questions: “How did you feel when you dropped the object?” “How did you finally keep hold of the object and pass it on?”, “How did your team support you?” and “Why did you keep going?”. The leaders finish the activity by pointing out that not giving up when the object was dropped requires perseverance. The leaders go on to explain that solving problems takes time, practice and perseverance.

Next, the students play a game designed to help them to develop a process for solving problems. Students are separated into two groups, with one peer leader for each group. For this activity, numbered questions have been arranged on paper in jigsaw puzzle shapes. Each group is given an envelope containing the pieces of the puzzle, as well as a scenario card (see Appendix B-9). One scenario says “You forgot to do your homework” or “You missed the bus”. The leader reads the scenario card to their group and asks students to choose a piece of the puzzle from the envelope. Some students may have more than one piece of the puzzle. Students are given time to look at their parts of the puzzle and think about an answer to the question as it applies to the scenario read out. Students are then asked to read out their questions and to answers in the order specified on the puzzle. After each of the questions has been answered, the group is asked to piece together the puzzle and write down the problem solving process in their books.

**Session eight.** For the first activity, students are asked to think carefully about a goal that they would like to achieve over the next few weeks and record it on
an activity sheet (refer to Appendix B-10). They are then asked to think about the steps that will need to be completed to attain their overall goal. For example, a student may wish to join the school tennis team. For the first step, the student might decide to learn all she or he can about the goal by researching information from books or internet and discussing the goal with family and sports teachers. For the second step, the student might practice playing tennis with a friend (or have formal lessons) on a regular basis and then, for the third step, try out for the tennis team. The leaders remind students that when attempting to achieve goals it is important to try to maintain an optimistic attitude and persevere when things get difficult. In the example discussed above, the leaders would emphasise that if things do not work out straight away, it is important not to give up. The student ought to continue to practice tennis and try out for the team again later. Finally, the leaders suggest that when students achieve their goals they should congratulate themselves. Students should think about all the successes that they have had along the way and how they have contributed to the final goal.

For the next activity, students are asked to think about the people who can (a) be there when they need help, (b) be there to share their thoughts, or (c) celebrate good times with, and record these people on an activity sheet (see Appendix B-11). The leaders let students know that the same people can appear in more than one section. Examples of people students could include are close friends, parents, teachers, brothers, sisters, and peer leaders.

The leaders end the session by presenting each group member with a certificate, acknowledging their participation in the Positive Action module. The leaders wish all the students well and encourage them to practice what they have learnt this term in peer support.

**Features for Successful Implementation**

In order to effectively implement the program, the Peer Support Foundation has identified a number of strategies that have been perceived by schools to be useful in maximising the potential impact of the program. These strategies relate to the roles and training of school staff, as well as the selection, training and supervision of the peer support leaders.
**Teacher Roles and Training**

The Peer Support Foundation advises that schools appoint a team of teachers who can share the responsibility of program implementation. The team can include Year 7 coordinators, members of the welfare/pastoral care team, PDHPE teachers and anyone else keen to join in. In order to effectively implement the program, the Peer Support Foundation suggests that schools allocate staff to a particular position. Each role or position, as delineated by the Peer Support Foundation, is described in detail below along with the training procedures.

**The role and training of the coordinating teacher.** The Peer Support Foundation advocates that one teacher should be selected to manage the Peer Support Program for his or her school. This teacher is referred to as the coordinating teacher. The Foundation emphasises that it is imperative that the coordinating teacher is enthusiastic about the program, willing to carry the extra responsibility, and capable of leading the team. The coordinating teacher is primarily responsible for organising the training of peer leaders and teachers, assisting in the briefing and debriefing processes and overseeing all aspects of program implementation.

The coordinating teacher is required to participate in a two-day training workshop run by the Peer Support Foundation. The workshop includes sessions on the Peer Support Program itself, so that they become thoroughly familiar with its aims and intended benefits, understand the operational requirements of running the program in their school, and learn about the responsibilities of each role to be held by the faculty team. During the workshop, the trainer goes through the program manual in detail. The coordinating teacher also learns how to train the other teachers who will be involved in the program. The Foundation strongly recommends that the coordinating teacher spend a minimum of three hours training all other staff involved.

**The role and training of facilitating teachers.** A team of two to three teachers are required to fill this role. Specifically, the role of facilitating teachers is to facilitate the training of the peer support leaders, as well as to provide support for the leaders through the briefing and debriefing processes. Facilitating teachers are recommended to attend the two-day workshop run by the Foundation. However, if this is not permissible, a half to full-day workshop may be facilitated by either the
coordinating teacher or Peer Support Foundation consultant. During training, facilitating teachers are informed of the purpose, benefits and operational requirements of the program. Their specific role and responsibilities are outlined, starting with their part in facilitating the student leadership training. The Foundation provides facilitating teachers with a leadership training manual, describing in detail the training plan. In this manual, the purpose and format of the activities of the student training are clearly set out. The peer support consultant (or coordinating teacher) runs through the manual with the facilitating teachers so that they are familiar with the structure and activities of the student leadership training. They also discuss the logistics of the student training (e.g., venue and resources).

During training, the facilitating teachers are also informed of their role in the briefing/debriefing process. The Foundation emphasise the importance of making time available before and after each peer support session to brief and debrief the peer support leaders. The briefing process is considered by the Foundation to be imperative for the leaders, so that they are aware of the aims and procedures of each of the sessions, as well as being supplied with all the necessary resources and materials required. The Foundation suggests that, as soon as possible after each session, teachers should spend fifteen to twenty minutes running through details of the forthcoming session.

The Foundation also recommends that the peer leaders must be carefully debriefed after each session. Some of the sessions may not run smoothly and may challenge the leader’s group management skills. The leaders need the opportunity after each session to process the experience and receive support from teachers. The foundation suggests that teachers spend fifteen to twenty minutes debriefing leaders as soon as possible after each session. Facilitating teachers are advised that debriefing should begin with a general overview of the procedures and activities of the session, followed by a discussion of any concerns or problems that may have arisen during the session. Teachers should keep a constant gauge on the level of confidence displayed by peer leaders. The Foundation suggests that it may be beneficial to run a refresher session for peer leaders halfway through the program to renew their enthusiasm and practice group management skills.

**The role and training of supervising teachers.** The Foundation recommends that numerous supervising teachers be appointed to supervise the groups during the
program sessions. The primary role of supervising teachers is to move from room to room, monitoring overall progress and dealing with any difficulties that might occur. The Foundation suggests that each supervising teacher should be responsible for three to four groups (approximately thirty students). They also note that while it is acceptable for teachers to join in some of the activities and discussions, they must allow the peer leaders to facilitate the session. Supervising teachers are asked to complete a feedback pro forma during each session, specifying the adequacy of the leaders in coordinating the activities and noting any difficulties that may have arisen. The Foundation suggests that the completed pro formas be used to help the facilitating teachers who will debrief the leaders identify some of the good things going on and any difficulties.

The coordinating teacher (or Peer Support Foundation Consultant) is advised to spend approximately three hours preparing supervising teachers for their role. During training, they would be informed of the purpose, anticipated benefits and structure of the program in their school, as well their specific role and responsibilities.

Leader Selection and Training

The selection and training of leaders is considered by the Peer Support Foundation to be of paramount importance. Students interested in participating are asked to apply for the position. The Peer Support Foundation suggests that, as part of the application process, students are asked to answer questions about their reasons for wanting to participate in the program and what they hope to gain from the experience. Interested students should also be made aware of the substantial time commitment and responsibility the position requires. Applicants are asked to return signed parent consent forms for program participation.

The Peer Support Foundation advocates that those students who are selected should, as a group, include an equal number of males and females who come from ethnically and racially diverse backgrounds. They also recommend that selected students ought to have demonstrated that they are responsible and caring individuals who can serve as positive role models for their peers. Selected students should have a history of contributing to the school community, display strong and appropriate social skills, are enthusiastic, and like to talk to others. The Foundation emphasises
the importance of selecting students who possess the capability to serve as leaders, but it is not necessary for such students to have held an official leadership position within the school. Selected students must make a commitment to facilitate each of the sessions, attend all briefing and debriefing sessions, as well as any refresher training courses.

The peer support leaders must attend an intensive two-day course to prepare them for their roles and instruct them on the nature and scope of their responsibilities. Training is recommended to take place on two consecutive days, away from the school environment, no more than four weeks before the program begins.

During the two-day training course, teachers begin by emphasising the importance of creating a comfortable and supportive atmosphere, which is essential to group cohesiveness. To create a comfortable and safe group dynamic, the leaders will need to appreciate the uniqueness of and actively listen to each person in their group. Through a series of carefully-designed games and exercises, students learn skills and behaviours that will enable them to be effective group leaders. The key areas of focus during training are (a) how to identify and empathise with the needs of group members, (b) group management techniques, (c) effective leadership characteristics, (d) instruction giving, and (e) techniques for planning a peer support session. Peer leaders are placed in pairs to learn how to work together and share responsibilities for running the sessions. The Peer Support Foundation recommends that, wherever possible, it is best to have co-leader teams comprised of one male and one female.

**Summary**

The current chapter has provided a detailed description of the secondary school Core Peer Support Program designed by the Peer Support Foundation. A thorough outline of the major aims and content of the program has been presented, as well as the key factors identified by the Peer Support Foundation for successful intervention. The following chapter describes the hypotheses of the current investigation that were formulated in regard to the program aims that have been outlined here.
CHAPTER 4

HYPOTHESES, RESEARCH QUESTIONS AND THEIR RATIONALE

Introduction

Over recent years, peer support programs have been proposed as part of the solution in alleviating many of the problems faced by youngsters during adolescence and the transition to secondary school. However, few studies have formally evaluated peer support programs and those that were carried out have typically been of questionable quality. The primary objectives of the present investigation were to empirically evaluate the effectiveness, strengths and limitations of a widely-used secondary school peer support program in order to increase understanding of the key strengths of peer support programs and elucidate whether such programs assist in easing the transition to adolescence and secondary school. Four studies were devised to test these aims. Study 1 involved testing the reliability and validity of measurement instruments employed in the present thesis. The selected measures were designed to assess specific aspects of students’ psychological well-being and adjustment to the secondary schooling context. Study 2 tested the effects of the peer support program on Year 7 students. The primary intention of this component of the research was to identify whether the intervention had a positive impact on students’ school self-concept, school citizenship, sense of self, connectedness, resourcefulness, and sense of possibility for the future. Study 3 sought to extend previous theory and research by testing the effects of the intervention on those who served as Peer Leaders. Study 4 was designed to identify students’ perceptions of the strengths and weaknesses of the intervention and thereby serve as a basis for improving intervention design.

The purpose of the current chapter is to present separately for each of the four components of the present research: (a) the overarching aims of the study, (b) the nature of the problem, (c) specific hypotheses to be tested, (d) research questions to be addressed, and (e) the rationale for such concerns. Hypothesised predictions were conceptualised based on the overarching goals of the program, previous theory, and
research. Where past research and theory provided little direction for clear predictions to be made, research questions have been formulated.

Study 1: Psychometric Properties of the Measurement Instruments

Aims

The objectives of Study 1 were to identify, develop and evaluate psychometrically sound measurement instruments for use with secondary school students. These instruments were designed to assess psychological outcomes in a variety of domains including self-concept, life effectiveness, coping strategies, perceptions of bullying, social support and enjoyment of school.

The Problem

Were the instruments employed in the present thesis reliable measures for secondary school students? Did responses to each of the instruments fit the a-priori factor structure that they were designed to measure? Was the factor structure different for younger (Year 7) and older (Year 10/11) secondary school students?

Statement of the Hypotheses

Hypothesis 1.1: Tests of reliability will demonstrate high reliability scores for each scale measured.

Hypothesis 1.2: Confirmatory Factor Analysis (CFA) will demonstrate the a-priori factor structure of each instrument.

Hypothesis 1.3: The factor structure of each of the instruments will be similar for younger (Year 7) and older (Year 10/11) secondary school students as demonstrated by Structural Equation Modelling tests of invariance.

Rationale for the Hypotheses

Hypothesis 1.1 to 1.3: Over the past decade, there has been increasing interest in the development of empirically supported interventions in psychology and education (Kratochwill & Stoiber, 2000). However, research in this area continues to be plagued by anecdotal evaluations and the use of instrumentation with unsubstantiated psychometric properties (Neill, Marsh, & Richards, 2001; Neill &
Richards, 1998). In order to improve intervention evaluations, researchers need to select appropriate instrumentation and apply a sound research design (Zaslow & Takanishi, 1993). For the present study, a number of existing as well as newly developed measures were rigorously evaluated to ensure that they provided a sound empirical basis upon which the effectiveness of the peer support program could subsequently be examined. Based on pilot test results, it was predicted that each of the instruments employed in the current research would be reliable and valid measures for secondary school students, and that their factor structure would not differ for younger (Year 7) and older (Year 10/11) students.

**Study 2: Effects of the Intervention on Year 7 Students**

**Aims**

The primary goal of Study 2 was to test the effects of the Peer Support Foundation’s secondary school program on Year 7 students in the following domains: School self-concepts, school citizenship, sense of self, connectedness, resourcefulness, and sense of possibility for the future. The intention here was to empirically evaluate the impact of the program on espoused outcomes. A secondary aim was to determine whether there were any other aspects of students’ psychological well-being and adjustment to the secondary schooling context that were affected by participation in the program.

**The Problem**

To what extent does a secondary school peer support intervention impact on Year 7 students’ academic self-concepts, school citizenship, sense of self, connectedness, resourcefulness, and sense of possibility for the future?

**Statement of the Hypotheses**

Based on the major objectives of the program outlined by the Peer Support Foundation, it was anticipated that Year 7 students would display increases in the following domains: school self-concept, school citizenship, general sense of self, connectedness, resourcefulness, and sense of possibility for the future. The specific
hypotheses developed to address each of these specified objectives of the program are presented below.

**Predicted effects on school self-concept**

Hypothesis 2.1: Year 7 students who have participated in the peer support intervention will report higher general school self-concept scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.2: Year 7 students who have participated in the peer support intervention will report higher verbal self-concept scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

**Predicted effects on school citizenship**

Hypothesis 2.3: Year 7 students who have participated in the peer support intervention will report lower pro-bully scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.4: Year 7 students who have participated in the peer support intervention will report higher pro-victim scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.5: Year 7 students who have participated in the peer support intervention will report higher honesty/trustworthiness self-concept scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

**Predicted effects on general sense of self**

Hypothesis 2.6: Year 7 students who have participated in the peer support intervention will report higher self-confidence scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.7: Year 7 students who have participated in the peer support intervention will report higher global self-esteem scores than students in the control
groups after the conclusion of the intervention and these gains will be maintained over time.

**Predicted effects on connectedness**

Hypothesis 2.8: Year 7 students who have participated in the peer support intervention will report higher *same-sex relations self-concept* scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.9: Year 7 students who have participated in the peer support intervention will report higher *opposite-sex relations self-concept* scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.10: Year 7 students who have participated in the peer support intervention will report higher *cooperative teamwork* scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.11: Year 7 students who have participated in the peer support intervention will report higher *peer support* scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

**Predicted effects on resourcefulness**

Hypothesis 2.12: Year 7 students who have participated in the peer support intervention will report higher *problem solving strategies* than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.13: Year 7 students who have participated in the peer support intervention will report higher *support seeking strategies* than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.14: Year 7 students who have participated in the peer support intervention will report lower *problem avoidance strategies* than students in the
control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.15: Year 7 students who have participated in the peer support intervention will report higher open thinking scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.16: Year 7 students who have participated in the peer support intervention will report higher coping with change scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.17: Year 7 students who have participated in the peer support intervention will report higher time efficiency scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Hypothesis 2.18: Year 7 students who have participated in the peer support intervention will report higher stress management scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Predicted effects on sense of possibility

Hypothesis 2.19: Year 7 students who have participated in the peer support intervention will report higher self-efficacy scores than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.

Statement of the Research Questions

Research Question 2.1: What other non-predicted effects does the peer support program have on Year 7 students?

Research Question 2.2: Do Year 7 students with lower pre-intervention scores evidence higher gains on outcome measures following the intervention than Year 7 students with higher pre-intervention scores (i.e., an aptitude-treatment interaction effect).
Rationale for the Hypotheses and Research Questions

Rationale for school self-concept predictions

Hypothesis 2.1 to 2.2: The Peer Support Foundation (2001) advocates that their secondary school program has a “cross-curricula focus” (p. 1), and is particularly relevant to the following key learning areas: English; Personal Development, Health and Physical Education (PDHPE); and Human Society and its Environment (HSIE). They propose that the program contributes to competence in these areas by encouraging students to: Share their ideas, feelings and information with others; listen critically and offer constructive responses to others; as well as respect different viewpoints (see Chapter 3). In consideration of these program aims, the current study sought to investigate the effects of the program on students’ academic self-concepts. In the present thesis, school self-concept was defined as students’ self-perceptions of their ability, enjoyment and interest in school subjects. The three school scales measured in the present research were verbal, mathematics and general school self-concept (see Chapter 5 for further details on the school self-concept scales).

Many previous program evaluation studies, which were mostly based on global measures of self-concept, were unlikely to find any significant effects (see Marsh & Craven, 1997). However, recent advances in theory and measurement have provided researchers with a much stronger basis for the evaluation of intervention programs (Craven, Marsh & Burnett, 2003). Marsh (1990) pointed out that dimensions of self-concept specifically relevant to the goals of the intervention should be affected substantially more than unrelated dimensions. Applications of this construct validity approach to the study of intervention effects have found that changes on particular dimensions of self-concept were specific to the goals of the intervention (Craven, Marsh & Debus, 1991; Marsh & Richards, 1988; Craven, Marsh & Burnett, 2003). Consequently, in view of the intended outcomes of the program outlined by the Peer Support Foundation, it was predicted that the program would have a positive impact on students’ verbal self-concepts. Clearly, verbal skills are used more in the subject areas relevant to the goals of the intervention than mathematical skills. As asserted by the Peer Support Foundation (2001), the program teaches students to “communicate with others”, “use spoken language effectively”
and “listen for specific purposes” (p. 5). Furthermore, as the foundation considers the program to be relevant to other subject areas besides English, including PDHPE and HSIE, it was anticipated that the intervention should affect students’ ratings of their skills and ability in school subjects in general. The positive effects of the program on verbal and general school and self-concepts were also anticipated to be maintained over time as the Peer Support Foundation predicts enduring effects of the intervention.

In view of the curriculum links specified in the program manual (see Chapter 3), it is apparent that verbal and general school self-concepts should be substantially more affected by the intervention than mathematics self-concept. As shown in Appendix 4A, none of the intended learning outcomes was applicable to the attainment of mathematical skills. Furthermore, previous research has not suggested that a program such as this would enhance students’ ability, enjoyment and interest in mathematics. As a result, the program was not predicted to affect mathematics self-concept.

Rationale for school citizenship

Hypothesis 2.3 to 2.4: The peer support program was designed to develop skills for “positive, socially responsible participation in the school community” (Peer Support Foundation, 2001, p. 6). Part of this endeavour was to create a safe school environment, free from violence or harassment. In this regard, the Foundation advocates that the program teaches students to develop concern for student welfare, to accept cultural diversity within their school community, and to resolve conflict in a peaceful manner. In accordance with these aims, it was predicted that the program would have a positive impact on the way in which students would endorse aggressive attitudes.

Two scales were used in the present research to assess students’ perceptions of bullying; namely pro-bully and pro-victim attitudes (see Chapter 5 for description of these scales). On the basis of the goals of the program, it was hypothesised that the intervention would lead to a reduction of pro-bully scores and a corresponding increase in pro-victim scores. The positive effects of the intervention on these scales were predicted to remain over time.
The program also aimed to encourage students to “act in a fair and responsible manner” (Peer Support Foundation, 2001, p. 5). Throughout the program, students are encouraged to explore choices in behaviour, think about how their choices may affect others, and choose positive patterns of behaviour. In concordance with the aims of the program, it was anticipated that the intervention would increase student honesty and dependability (see Chapter 5 for a description of the honesty/trustworthiness scale employed in the present research). The increase in honesty/trustworthiness was predicted to be maintained over time.

**Rationale for sense of self**

Hypothesis 2.6 to 2.7: The Peer Support Foundation (2001) advocates that their program enhances students’ sense of self. The program aims to do this by encouraging students to feel more confident, capable and satisfied with the way they are (see Chapter 3). According to the foundation, students learn to “accept themselves as they grow and change”, “develop a sense of their own worth and dignity”, and “value themselves as important members of various groups” (Peer Support Foundation, 2001, pp. 3-5). Consequently, it was anticipated that the program should enhance students’ self-perceptions of their general self-worth, self-confidence and self-satisfaction. A global self-esteem scale and self-confidence scale were included in the current research to assess change in students’ general sense of self (see Chapter 5 for details). It was hypothesised that the program would lead to increases in these two scales, and that the effects would be maintained over time.

**Rationale for connectedness**

Hypothesis 2.8 to 2.11: The Peer Support Foundation (2001) states that their program was designed to enhance student relations and promote a sense of connectedness among students (see Appendix 4B). The program sought to improve student relations by encouraging them to: Share their ideas and feelings with others, be sensitive to the need for shared responsibility and decision making, negotiate with others and respect different viewpoints, develop support networks, and make a commitment to developing and maintaining positive relationships (Peer Support Foundation, 2001). As asserted by the Peer Support Foundation (2003), “Basically, it’s all about helping and caring for one another” (http://www.pakenhamsc.vic.edu.au/peersup.htm). Based on the goals outlined by the Peer
Support Foundation, it was hypothesised that the intervention would lead to an increase in same-sex relations, opposite-sex relations, co-operative teamwork and peer support, and that the increases would be sustained over time.

**Rationale for resourcefulness**

Hypothesis 2.11 to 2.17: Another major goal of the program was to enhance student resourcefulness. The Peer Support Foundation (2001) portrays resourceful individuals as having the ability to reflect on and learn from their experiences, as well as creatively turning challenges into opportunities for continued growth and learning (see Chapter 3). The program was designed to promote resourcefulness by firstly, teaching students how to cope with problems so that they can be proactive and resilient in dealing with life experiences. Throughout the intervention program, students are required to plan, and put into practice, actions to effectively deal with problems and gain an understanding of the importance of seeking assistance where needed. As a result, it was hypothesized that the program would lead to an increase in problem solving and seeking social support, and a corresponding decrease in problem avoidance.

To enhance student resourcefulness, students are also encouraged to be open and adaptable in their thinking and ideas. For example, during the program students are taught to be open and not fixed in their ideas when facing problem situations. They are also advised to generate multiple alternatives to the particular problem and explore the potential consequences of each alternative. Furthermore, when working with others, students are encouraged to be open-minded and respect different viewpoints. The intention is to promote broadmindedness so that they may increase their opportunities for growth and learning. In view of the goals and content of the program, it was predicted that there would be a positive impact on students’ levels of open thinking.

Part of being resilient also requires that individuals are able to cope effectively with change. The Peer Support Foundation (2001) aims to teach students how to cope with changes in friendships and new teacher expectations following the transition to secondary school. The program also seeks to equip students with the skills needed for resilience to the changes that they will undoubtedly face in their
life's journey ahead. In accordance with these aims, it was predicted, therefore, that the program would enhance students' ability to cope with change.

Finally, the Peer Support Foundation aims to enhance resourcefulness by helping students become more organised and less stressed at school. During the program, students are taught how to manage their time and tasks effectively. For example, leaders advise students how to organise their time at home so that they can study and complete assignments. In addition, students are taught helpful strategies for managing stress, such as talking to a friend, exercising and learning to relax. As a result, it was predicted that students would show increases in time efficiency and stress management. All of the predicted effects on resourcefulness were anticipated to be maintained over time (see Chapter 5 for details on the scales used to assess coping strategies, open thinking, coping with change, time efficiency and stress management).

Rationale for sense of possibility

Hypothesis 2.18: Another major aim of the peer support program is to enhance students' sense of possibility (see Chapter 3). According to the Peer Support Foundation (2001), sense of possibility involves an awareness and belief that positive outcomes can be achieved in the future. Self-efficacy scales are often used in research to measure positive outcome expectancies (see Chapter 2). In accordance with the program aims, it was predicted that the program would lead to an increase in self-efficacy, and that these gains would be maintained over time.

Rationale for Research Questions

Research Question 2.1: Although it was predicted that the peer support program would have a positive impact on school self-concept, school citizenship, general sense of self, connectedness, resourcefulness, and sense of possibility for the future, very little empirical research has been conducted in this area. Certainly, the program also has the potential to impact on other aspects of students' psychological well-being and adjustment to secondary school. Hence, it was important to test the effects of the program on a number of additional scales (e.g., enjoyment of school, parent relations and social effectiveness) that were included in the test battery (see Chapter 5 for information on all scales). Given that previous research provides little
direction for predicting the impact of the PSP on such constructs, a research question was posed.

Research Question 2.2: Intervention programs have frequently been criticised on the basis of showing positive outcomes as demonstration programs yet failing to maintain these results when disseminated more widely in the community (Elia, 1991). One possible explanation of why significant results are rarely found in universal programs is that most participants are functioning in the normal range prior to the intervention program. Consequently, the effects of the peer support program may depend on aptitude-treatment interactions (ATIs). In other words, students who have lower pre-intervention scores may benefit more from the intervention than students who are scoring at or above the normal range. As asserted by Smith and Sechrest (1991), ATI research can uncover program effects that, “compared with main effects, are stronger and more reliable” (p. 233). In the present research, the presence of a significant interaction would imply that the program works better for some students than others. This research question was designed to advance current theory and research by furthering our understanding of the type of individuals who may benefit most from peer support programs.

Study 3: Effects of the Intervention on the Peer Support Leaders

Aims

The primary aim of Study 3 was to extend previous research by elucidating the effects of participating as a leader in the Peer Support Foundation’s secondary school program on leadership ability and other psychological constructs.

The Problem

To what extent does the secondary school peer support intervention impact on Peer Leaders’ leadership ability and other psychological constructs?

Statement of the Hypothesis

Hypothesis 3.1: Peer support leaders will report higher scores on leadership ability than students in the control groups after the conclusion of the intervention and these gains will be maintained over time.
Statement of the Research Question

Research Question 3.1: In what other ways do peer leaders benefit from participating in the peer support program?

Rationale for Hypothesis

Hypothesis 3.1: The Peer Support Foundation (2003) advocates that the program develops the middle/senior school students’ leadership skills to benefit both the leaders and their school. Based on this view, it was predicted that the intervention would lead to an increase in leadership ability for those who served as peer support leaders and that the effects would be maintained over time.

Rationale for Research Question

Research Question 3.1: Although some have speculated on the other potential benefits of serving as a peer support leader, noting gains to self-esteem, listening skills, and pro-social attitudes (Charlton, 1998), very little empirical research has been conducted in this area. As past research has provided little direction for clear predictions to be made, this issue was formulated as a research question.

Study 4: Quantitative and Qualitative Student Evaluation of the Program

Aims

The goals of Study 4 were to examine participants’ perceptions (Year 7 students and peer leaders) of the impact, strengths and limitations of the program in order to further strengthen peer support intervention design.

Statement of the Research Question

What do students perceive as the impact, strengths and limitations of the peer support program?

Rationale for Research Question

There is a paucity of research that has investigated the strengths and limitations of peer support programs from the personal perspectives of students. However, researchers have offered generic suggestions as to the particular
characteristics of intervention programs that may be more effective at producing desirable outcomes than others. For example, Kotloff et al. (1993) suggested that the fidelity of implementation and competence of the group facilitator may be the key to the success of intervention programs. In the current study, it is possible that certain schools may have been more committed to and had more resources for implementing the program than others. Some schools may have trained and supervised their leaders more effectively than others. Further, some peer leaders may have been more successful in facilitating group discussions and guiding positive peer influence than others. Therefore, it was important to examine the strengths and limitations of the program from the perspective of the Year 7 students and peer support leaders so that further information could be elucidated on potential factors that may strengthen peer support intervention design.

Summary

The current chapter demonstrated that the four major objectives of the current research were to (a) investigate the psychometric properties of each of the measurement instruments, (b) examine the effects of the peer support program on Year 7 students (c) examine the effects of the program on the peer leaders, and (d) identify students’ perceptions of the strengths and limitations of the program. Hypotheses and research questions were developed in order to satisfy the major aims of the study and a rationale was presented for each of the predictions made. The following chapter describes the methodology that was designed specifically to address the hypotheses and research questions that have been outlined here.
CHAPTER 5
METHODOLOGY

Introduction

The primary aim of this chapter is to provide a comprehensive presentation of the methodology that was employed in the present investigation. Four distinct studies were constructed to successfully address the aims, hypotheses and research questions of the current research (see Chapter 4). Study 1 involved testing the reliability and validity of measurement instruments employed. Studies 2 and 3 sought to empirically test the effects of the peer support intervention on Year 7 students and on the peer support leaders, and Study 4 was designed to identify student perceptions of the strengths and weaknesses of the intervention. For Study 4, a combination of quantitative and qualitative methods was used to gain insight into students’ personal perspectives of the program.

In this chapter, the methodology employed in each of the four studies is presented. A detailed description of the characteristics of the participants, the survey procedure relating to the quantitative analyses, the materials used in the questionnaire, as well as an outline of the research designs for each distinct study component is outlined. A brief orientation of the statistical procedures used to analyse the data is also presented. More specific details of methodology and statistical analyses unique to each of the study components appear in each of the result sections pertaining to each of the four studies.

Participants

Schooling in Australia is generally divided into a primary/secondary structure with the transition between the two occurring around early adolescence. The first year of secondary school typically begins in the seventh year of schooling (roughly 12 years of age). Selected Catholic secondary schools across New South Wales were invited to participate in the present research. Their selection and participation in the present research project was dictated by a number of requirements. Firstly, for Studies 1 through 3, it was essential that participants had not previously been involved in a peer support program of any description within their school. Over recent years, an increasing number of schools in New South Wales have adopted
various forms of peer support programs, thereby reducing the number of schools appropriate to participate in this study. Furthermore, the participating schools in Studies 2 and 3 were required to be committed to implementing all aspects of the Peer Support Foundation’s Core Program in 2002 and be prepared to set aside the time required for students to complete questionnaires fundamental to testing the effects of this program.

**Study 1**

A total of 2,335 students (63% male and 37% female) enrolled in Year 7, 10 and 11 participated in the Study 1. The age of the participants ranged from 11 to 17 years. Participating students were drawn from five Catholic secondary schools across New South Wales. Two of these schools were co-educational and three were single-sex (two boys only, one girls only). Two of the schools were metropolitan, one was outer-metropolitan, and two were non-metropolitan. School regions all fell within one standard deviation either above or below the average Index of Relative Disadvantage (Australian Bureau of Statistics, 2001b). The Index of Relative Socio-Economic Disadvantage is a measure of socio-economic status that is derived from numerous indicators such as income level, educational qualifications, and occupation (see Australian Bureau of Statistics, 1998, for a detailed description of this index). Of the total participants, 93.1% \( (n = 2164) \) were born in Australia. The highest proportion of non-Australian born students reported emigration from the United Kingdom \( (n = 24) \) and China \( (n = 13) \). Appendix C-1 presents further information about the gender composition and country of birth of students for each of the participating schools.

**Study 2**

A sub-sample of the original sample took part in Study 2, which consisted of a two year six-wave study. Four of the original five schools agreed to participate in this study, which aimed to elucidate the effectiveness of the peer support intervention on Year 7 students. However, due to unforeseen school circumstances, one of these schools had to withdraw from the study before the completion of the research project, leaving three schools to participate. The results from these three schools
were the basis of analyses in Study 2. Two of these schools were co-educational and one was a boys only school.

A total of 930 Year 7 students (63% male and 37% female) from three secondary schools constituted the participant pool for this study. The age of participants ranged from 11 to 14 years (with a mean age of 11.94, SD of .45). Of the 930 participants in this study, 478 students formed the control (or no intervention) group and 452 students formed the experimental (or peer support intervention) group. Of the 478 participants in the control group, 65% were male and 35% were female. Similarly, of those in the experimental group, 62% were male and 38% were female. Further information about the gender composition and country of birth of participants in the experimental and control groups is presented in Table 5.1.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>(%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>287</td>
<td>(61.5)</td>
</tr>
<tr>
<td>Female</td>
<td>174</td>
<td>(38.5)</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Country of Birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>403</td>
<td>(95.0)</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>(5.0)</td>
</tr>
<tr>
<td>Missing</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

**Study 3**

The same four schools that originally participated in Study 2 also agreed to take part in Study 3, which aimed to elucidate the effects of the intervention on the peer support leaders. In accordance with Study 2, one of the participating schools had to withdraw from Study 3 before the completion of the research project, leaving three schools to participate. The results from these three schools were the basis of analyses for this study. The participants consisted of Year 10 students for all but one of the schools that requested to have Year 11 students serve as peer leaders. Accordingly,
for this school only, both the control and experimental groups consisted of Year 11 rather than Year 10 students.

A total of 858 students participated in Study 3. The age of participants from the three final schools ranged from 14 to 17 years (with a mean age of 15.37, SD of .76). Of the 850 participants in this study, 412 students formed the control group one, 347 students formed control group two, and 99 students formed the experimental group. These 99 students from the experimental group served as peer support leaders (see Chapter 3 for a detailed description of how the leaders were selected). The gender composition and country of birth of participants in the experimental and control groups is presented in Table 5.2.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Experimental Group</th>
<th>Control Group 1</th>
<th>Control Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>(%)</td>
<td>N</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52</td>
<td>(52.5)</td>
<td>251</td>
</tr>
<tr>
<td>Female</td>
<td>47</td>
<td>(47.5)</td>
<td>153</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Country of Birth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>84</td>
<td>(92.3)</td>
<td>333</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>(7.7)</td>
<td>28</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>

**Study 4**

A sub-sample of students participating in the experimental groups from Studies 2 and 3 took part in Study 4, which was designed to identify students’ perspectives on the strengths and weaknesses of the peer support program. The first component of Study 4 consisted of a questionnaire that included a combination of quantitative and qualitative items. All students from the experimental groups were invited to offer responses to this questionnaire. A total of 410 Year 7 students (representing 90.7% of the experimental group sample from Study 2) and 85 peer support leaders (representing 85.9% of the experimental group sample from Study 3)
completed the quantitative component of the student evaluation. Of these
participants, a total of 408 Year 7 (representing 90.3% of the experimental year
sample from Study 1) and 75 peer support leaders (representing 75.8% of the
experimental sample from Study 2) completed responses to the qualitative
component of the questionnaire.

Students were also invited to take part in discussion groups to further explore
students’ perspectives of the peer support program. Almost all students indicated that
they would be willing to participate. A random selection of 163 students (119 Year 7
students and 44 peer support leaders) was invited to participate. Roughly equal
numbers of respondents were drawn from each of the participating schools.

Quantitative Measures

Self-Concept

The short form of the Self Description Questionnaire II (the SDQII-S) (see
Appendix D-1) was selected for the present research to measure self-concept. This
recently developed instrument is a brief version of the SDQII (Marsh, 1990)
designed for use with adolescents aged 12 to 18. As with other versions of the SDQ,
the SDQII-S is based on the multidimensional and hierarchical model of self-concept
posited by Shavelson et al. (1976). The short form contains half of the original items
from the SDQII (Marsh, 1990) and retains all 11 of its self-concept factors (see Table
5.3). The short form contains 51 items, 20 of which are negatively worded (see Table
5.3 for example items). In keeping with the SDQII, all items are scored on a 6-point
Likert response scale (1 = False; 6 = True). The 102-item SDQII was not selected for
the present study due to its length, which was perceived as too long for the present
study, particularly as it was being used in combination with a battery of other
instruments.

The SDQ instruments have been evaluated to be among the best measures of
multidimensional self-concept available in terms of psychometric properties and
construct validation (Byrne, 1996; Hattie, 1992; Wylie, 1989) and recent research
suggests that the new short form of the SDQII is no exception. Preliminary work by
Marsh, Ellis, Parada, Richards and Heubeck (in press) demonstrated that the new
short form evinces good psychometric properties (reliability and factor structure)
with secondary school students. In their study, reliabilities were consistently high for the 11 SDQII-S factors (.80 to .89, $M = .84$) and multiple group confirmatory factor analyses demonstrated that the factor structure based on responses to the short form were invariant with the factor structure based on responses to the original 102-item SDQII.

Table 5.3

**Summary Description of the SDQII-S Scales**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>Example Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abilities</td>
<td>Student ratings of their skills and interest in sports, games and physical activities</td>
<td>“I enjoy things like sports, gym, and dance”</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>Student ratings of their physical attractiveness, how their appearance compares with others, and how others think they look</td>
<td>“I am good looking”</td>
</tr>
<tr>
<td>Same-Sex Relationships</td>
<td>Student ratings of their popularity with members of the same sex and how easily they make friends with members of the same sex</td>
<td>“I make friends easily with members of my own sex”</td>
</tr>
<tr>
<td>Opposite-Sex Relationships</td>
<td>Student ratings of their popularity with members of the opposite sex and how easily they make friends with members of the opposite sex</td>
<td>“I am not very popular with members of the opposite sex”</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>Student ratings of their honesty and trustworthiness</td>
<td>“I sometimes tell lies to stay out of trouble”</td>
</tr>
<tr>
<td>Parent Relationships</td>
<td>Student ratings of how well they get along with their parents, whether they like their parents, and the quality of their interactions with their parents</td>
<td>“I get along well with my parents”</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>Student ratings of themselves as being calm and relaxed, emotional stability, and how much they worry</td>
<td>“I worry about a lot of things”</td>
</tr>
<tr>
<td>Verbal</td>
<td>Student ratings of their skills and ability in English</td>
<td>“I learn things quickly in English classes”</td>
</tr>
<tr>
<td>Math</td>
<td>Student ratings of their skills and ability in mathematics</td>
<td>“I do badly in tests in Mathematics”</td>
</tr>
<tr>
<td>General School</td>
<td>Student ratings of their skills and ability in school subjects in general</td>
<td>“I am good at most school subjects”</td>
</tr>
<tr>
<td>Global Self-Esteem</td>
<td>Student ratings of themselves as effective, capable individuals, who are proud and satisfied with the way they are</td>
<td>“Most things I do, I do well”</td>
</tr>
</tbody>
</table>

Over the past decade, the SDQ instruments have been widely-used by researchers for a variety of purposes, including evaluative studies of school-based
intervention programs (see Marsh & Craven, 1997). The multidimensionality of the instruments provides a strong basis for analyses on the effectiveness of intervention programs that target specific facets of self-concept. As Marsh, Richards, and Barnes (1986) noted, many former studies that relied solely on global measures of self-concept were unable to find significant changes in self-concept following the program. In contrast, recent studies utilising a multidimensional measure of self-concept have found significant changes in the specific area of self-concept most logically related to the goals of the intervention (Marsh & Craven, 1997; Craven, Marsh & Burnett, 2003).

**Life Effectiveness**

The revised version of the Review of Personal Effectiveness scale (ROPE; Richards & Neill, 2000b) (see Appendix D-2) was designed to measure key psychological and behavioural domains which constitute “life fitness” or “life proficiency”. The ROPE was originally developed from the Life Effectiveness Questionnaire (LEQ; Neill, Marsh, & Richards, 1997) and has been specifically designed to be sensitive to the types of effects often produced by experience-based intervention programs.

The ROPE contains 12 areas of personal effectiveness including personal abilities and beliefs (Self-Confidence, Self-Efficacy, Stress Management, Open Thinking), social skills (Social Effectiveness, Cooperative Teamwork, Leadership Ability), organisational skills (Time Management, Quality Seeking, Coping with Change), an ‘energy’ scale called Active Involvement, as well as a measure of overall effectiveness in all aspects of life. In addition, the instrument contains an in-built control scale that aims to assist in determining whether changes reported in the other scales are due to program effects or simply due to retesting on the same instrument. The instrument consists of 39 items, all of which are rated on a scale of “1-False, Not like me” to “8-True, Like me” (see Table 5.4 for example items).

Over the past decade, the ROPE and LEQ have been employed in research on the effects of participation in outdoor education programs. Results emanating from this research have indicated that these instruments are useful tools for evaluating program outcomes (e.g., Neill, Richards, & Badenoch, 1997). Furthermore, preliminary research has demonstrated that the new version of the ROPE is
psychometrically sound in terms of reliability and factor structure (Richards, Ellis & Neill, 2002). Richards et al. (2002) reported high reliabilities for each of the ROPE factors (range = .79 to .90), as well as substantial factor loadings (range = .65 to .86).

Table 5.4

Summary Description of the ROPE scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>Example Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Confidence</td>
<td>Confidence and belief in personal ability to be successful</td>
<td>“I am confident in my ability to be successful”</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>Ability to handle things and to find solutions in difficult situations</td>
<td>“No matter what the situation is I can handle it”</td>
</tr>
<tr>
<td>Stress Management</td>
<td>Self-control and calmness in stressful situations</td>
<td>“I am calm when things go wrong”</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>Openness and adaptability in thinking and ideas</td>
<td>“I am open to new thoughts and ideas”</td>
</tr>
<tr>
<td>Social Effectiveness</td>
<td>Competence and effectiveness in communicating and operating in social situations</td>
<td>“I communicate effectively in social situations”</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td>Cooperating in team situations</td>
<td>“I am good at cooperating with team members”</td>
</tr>
<tr>
<td>Leadership Ability</td>
<td>Leadership capability</td>
<td>“I am seen as a capable leader”</td>
</tr>
<tr>
<td>Time Efficiency</td>
<td>Efficient planning and utilisation of time</td>
<td>“I am efficient and do not waste time”</td>
</tr>
<tr>
<td>Quality Seeking</td>
<td>Put effort into achieving the best possible results</td>
<td>“I try to get the best possible results when I do things”</td>
</tr>
<tr>
<td>Coping with Change</td>
<td>Ability to cope with change</td>
<td>“I cope well with changing situations”</td>
</tr>
<tr>
<td>Active Involvement</td>
<td>Use action and energy to make things happen</td>
<td>“I like being active and energetic”</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>The overall effectiveness of a person in all aspects of life</td>
<td>“Overall, in my life I am an effective person”</td>
</tr>
</tbody>
</table>

Coping

A new short form of the Coping Strategy Indicator (the CSI-S) (see Appendix D-3) was used in the present study. This instrument is a brief version of the CSI (Amirkhan, 1990) that was developed for the present research. The CSI was originally designed to measure three fundamental strategies of coping used in response to stressful situations or problems. These strategies include Problem Solving, Seeking Support, and Avoidance (see Table 5.5 for a description of the 3 scales and example items). Previous research has found factor analytic support for
the three strategies of coping, as well as good reliability and construct validity for the original long 33-item version of the CSI (Amirkhan, 1990).

Table 5.5

Summary Description of the CSI scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>Example Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td>Attempts to work out the problem by carefully planning a course of action or trying different ways to solve the problem until one works</td>
<td>“I make a plan of action about what I will do”</td>
</tr>
<tr>
<td>Seeking Support</td>
<td>Turns to others for comfort or advice</td>
<td>“I tell my fears and worries to a friend”</td>
</tr>
<tr>
<td>Avoidance</td>
<td>Physically or psychologically (i.e., through fantasy or distraction) withdraws from the problem</td>
<td>“I avoid the problem by watching television more than usual”</td>
</tr>
</tbody>
</table>

On the basis of pilot test results, 15 of the original 33 items were selected for use in the current study. The intention here was to design a shorted version of the CSI that retains all three of the coping factors, without sacrificing its good psychometric properties. Details on the pilot test procedure used in the present study are outlined later in this chapter. The instructions requested participants to indicate the extent to which they used each coping strategy when they face difficulties or problems. Students rated how they react when they face difficulties on a 6-point Likert scale (1 = Never to 6 = Always).

Perceptions of Bullying

To ascertain students’ perceptions of bullying, the Bullying Attitude Scale (APRI-A; Parada, 2000) was used in the present study (see Appendix D-4). This recently developed instrument was designed to measure two fundamental attitudes to bullying: Pro-Bully and Pro-Victim (see Table 5.6 for a description of these scales and example items). The Bullying Attitude Scale consists of 12 items that are all scored on a “1-False” to “6-True” response scale. To date, no details on the reliability and validity of this instrument have been published. Thus, it was considered essential to pilot test this instrument (details on the pilot test are presented
in this chapter) and examine its psychometric properties for the present study (see Chapter 6).

Table 5.6

*Summary Description of the APRI-A scales*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>Example Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-Bully</td>
<td>Students who believe that bullying is acceptable</td>
<td>“Bullying is OK if done in fun”</td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>Students who believe that bullying is unacceptable and should be stopped</td>
<td>“People who are bullied deserve our help”</td>
</tr>
</tbody>
</table>

*Parent and Peer Support*

For purposes of the present study, part of the Personal Affiliation Scale (PAS; Richards & Parada, 2000) was selected for use in the present study. The PAS has been designed to measure three dimensions of affiliation: Relationship, support and values. The support dimensions was of particular relevance to the present study in that it can be used to measure the degree of support respondents perceive to receive from others. Richards and Parada (2000) specifically designed the instrument so that responses could be given in terms of the researcher’s nominated target of focus. For the current study, two separate targets were chosen: Parents and school peers (see Table 5.7 for a description of the scales). Accordingly, this measure was used to assess the degree of support students perceive to receive from their parents and school peers. As the support component of the PAS consists of 4 items per target, a total of 8 items were used to measure support (see Appendix D-5). All of the items were responded to using a 6-point rating scale (1 = False, Not like me to 6 = True, Like me).
Table 5.7

Summary Description of the Support Scales Used in the Present Study

<table>
<thead>
<tr>
<th>Scale</th>
<th>Description</th>
<th>Example Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Support</td>
<td>The amount of support students believe they receive</td>
<td>“I can count on help and support, if I need it from my parents”</td>
</tr>
<tr>
<td></td>
<td>from their parents</td>
<td></td>
</tr>
<tr>
<td>Peer Support</td>
<td>The amount of support students believe they receive</td>
<td>“I can count on help and support, if I need it from my peers”</td>
</tr>
<tr>
<td></td>
<td>from their school peers</td>
<td></td>
</tr>
</tbody>
</table>

School Enjoyment

A new 5 item scale developed by Craven and Ellis (2000) was used to assess student’s enjoyment of school (see Appendix D-6). Each item was scored on a scale of “1-False, Not like me” to “8-True, Like me”. The suitability of this instrument for the present thesis was tested by means of a pilot study. The details of the pilot testing of the Enjoyment of School Scale are discussed later in this chapter.

Student Evaluation of the Peer Support Program

A quantitative student evaluation questionnaire was developed for the purposes of the present research to assess students’ views about the content, process and value of the peer support program. Two separate questionnaires were developed: One for the Year 7 students and another for the peer support leaders. The evaluation form for Year 7 students was designed to assess their perceptions of the program in terms of (a) its content, activities and value; (b) group rapport and cooperation; and (c) merit of their peer support leaders. The questionnaire consisted 18 items, all of which were rated on a scale of “1-Definitely/Totally False” to “8-Definitely/Totally True” (see items in Appendix D-7).

The questionnaire devised for the peer support leaders was designed to assess their perceptions of the program in terms of its (a) coordination and management, (b) appropriateness and value for Year 7 students, and (c) benefit for the program for the peer support leaders themselves. This questionnaire consisted of 15 items, which were rated on a scale of “1-Definitely/Totally False” to “8-Definitely/Totally True” (see items in Appendix D-8).
The quantitative items for both Year 7 students and the peer support leaders were adapted or taken directly from the Participants' Evaluation of Educational Quality (PEEQ) measure (Richards & Neill, 2000a). The PEEQ has been employed in previous evaluative studies examining the impact of outdoor education programs. Given the latter focus of the original version, the items had to be adapted so that they would be relevant to this program of research. The quantitative student evaluation of the peer support program was completed at Time 2 Year 2, on completion of the peer support program.

**Student Background**

A number of questions were devised to gather relevant background information about each student. Students were asked to complete these questions at Time 1 test administration. Student information gathered included gender, date of birth and country of origin (see Appendix 5I). If new students came to the school at Time 2 or Time 3, they were asked to fill out these questions during test administration.

**Pilot Study of the Quantitative Measures**

A pilot test of each of the quantitative measures was conducted so the suitability of the instruments for the present thesis could be verified before Time 1 Year 1 administration. Given that most of the instruments were developed in recent years and had not been utilised in a large-scale longitudinal study prior to this investigation, a pilot test was considered imperative. The main objectives of this pilot study were to first, ensure the suitability of the format of the questionnaire and response alternatives, second, check whether each of the items could be understood by secondary school students, and third, conduct initial psychometric assessments of each of the instruments. Respondents were 424 secondary school students from a school in Western Sydney. Forty-nine percent of the respondents were male and 51% were female. The age of the participants ranged from 11 to 17 years.

The pilot study revealed that several Year 7 students had difficulty understanding the overall effectiveness scale items from the ROPE. As a result, the term “effective” was explained in subsequent test administrations as “success and achievement”. The pilot test also demonstrated that a definition of “bullying” was
required before students were reliably able to respond to items from the APRI-A. Hence, the following definition was provided to students in subsequent test administrations:

Bullying is when someone deliberately hurts or frightens someone weaker than themselves. Bullying may be done in different forms by teasing, threatening actions or gestures, name-calling, hitting or not letting people take part in activities. Bullying is usually repeated over time.

The pilot study found that the response alternatives could be understood by secondary school students and were utilised successfully throughout the questionnaire. Preliminary confirmatory, correlational, and reliability analyses of all scales were conducted, with the results indicating that each of the instruments were psychometrically sound. Results regarding the psychometric properties (reliability and factor structure) of each of the instruments utilised with a larger sample are presented in Chapter 6.

Further analyses of the 33-item CSI indicated that this instrument could be refined. This refinement was seen to be important not only in terms of retaining items which were strongest from a measurement perspective but also to reduce the demands to be placed on respondents throughout the six waves of data collection involved in the study. The refinement of the CSI involved examining results from: one-factor congeneric CFA models, item-total correlations, and Cronbach’s alpha coefficients in the context of changes to alpha coefficients given the removal of specific items from the scale. The results from the pilot test indicated that the measure could be reduced to 15 items without sacrificing its good psychometric properties. The psychometric properties of the shortened version of the CSI are presented in Chapter 6.

Qualitative Measures

Student Evaluation of the Peer Support Program

Three open-ended questions were included at the end of the quantitative questionnaire so that students could convey their perceptions of the peer support
program in their own words. The qualitative student evaluation for Year 7 students comprised the following questions:

1. How has the peer support program been helpful to you?

2. Any other comments you would like to make about the peer support program?

3. Any other comments you would like to make about your peer support leaders?

These questions gave all Year 7 students the opportunity to express their views about the benefits of the program and their perceptions of the program in general, and express their perceptions about the peer support leaders. Participating leaders were also invited to identify the ways in which the program was of benefit to the Year 7 students as well as to themselves. The qualitative student evaluation for the peer support leaders comprised the following questions:

1. How has the peer support program been helpful to Year 7 students?

2. What skills did you develop by being involved in the peer support program?

3. Any other comments you would like to make about the peer support program?

The qualitative student evaluation of the peer support program was included at the end of the quantitative questionnaire at Time 2 Year 2.

**Focus Discussion Groups**

A random selection of students was invited to participate in focus group discussions in order to elucidate students’ perceptions of the strengths and weaknesses of the peer support program. A semi-structured interview guide formed the basis of discussion (see Appendix E-1). Each of the focus groups consisted of 6 to 8 students and lasted for approximately 20 minutes (ranging between 15 and 30 minutes). Twenty-three focus groups were conducted across the participating schools.
Procedure

Consent to conduct the current study was obtained from the University of Western Sydney Ethics Review Committee (Human Subjects) as well as the New South Wales Department of Education and Training. Participants under the age of 16 years were required by the committee to have written parental or guardian permission to participate. This procedure was completed by all participants prior to the administration of the questionnaire. Participants with parental/guardian permission were invited to volunteer to participate in the study based on informed consent.

Questionnaire Administration

Questionnaires were administered in a large hall by the research group during a regularly scheduled class period. Anonymity was guaranteed and participants were assured that the data would be used for research purposes only and not by the school. Each testing session began with a brief set of instructions on how to use the rating scale in the questionnaire and the meanings of some of the more difficult items were described to the Year 7 students. All students were encouraged to seek assistance from a member of the research group if they were experiencing any difficulties in responding to an item. Students were then asked to work through the questionnaire on their own and submit the completed form to the researcher when they had finished. The administration of the questionnaire took approximately 50 minutes for each student.

A total of six occasions of testing were conducted for Study 2 and Study 3 over a two year period. During the first year of the study (2001), students were asked to complete questionnaires on three separate occasions. Those students who completed questionnaires in 2001 formed the control groups. During the second year of the study (2002), a different group of students completed questionnaires on three occasions. Those students in 2002 who participated in the peer support program constituted the experimental group. Testing was conducted in:

1. February/March 2002: towards the start of the school year (Time 1, Year 1).
2. August/September 2002: six months after Time 1 (Time 2, Year 1).
3. December 2002: towards the end of the school year (Time 3, Year 1).
4. February/March 2003: prior to the introduction of the peer support program (Time 1, Year 2).

5. August/September 2003: on completion of the program (Time 2, Year 2).

6. December 2002: towards the end of the school year (Time 3, Year 2).

The same testing procedures were followed for all six testing administration occasions. Students were administered the supplementary quantitative and qualitative questionnaires for Study 4 at Time 2 Year 2 (upon completion of the program).

**Focus Group Discussions**

Students who participated in a qualitative interview group at Time 2 Year 2 were interviewed on the same day after the conclusion of the testing session. Classrooms and quiet outdoor areas on the school grounds were used as settings in which to conduct the focus group discussions. Participants were welcomed and informed that the researcher was interested in complementing the survey data with group discussions that would provide further information into the personal perspectives of students. Student responses were transcribed onto a large sheet of butcher’s paper. The strength of this approach was that it encouraged students to react to and build upon the responses of other group members. With the responses being recorded onto paper, students felt that their responses were being heard and important. Furthermore, the method allowed students to check that the researcher had correctly recorded and interpreted their responses onto the paper.

The focus group discussions were facilitated by the researcher and two PhD student psychologists. The students were prepared for their role through a two hour training session, where they developed an understanding of the peer support program, the procedures for carrying out the focus groups, as well as the potential nature of the group dynamics that might arise as a result of group composition. Each of the focus groups consisted of 6 to 8 students and they lasted for approximately 20 minutes (ranging between 15 and 30 minutes).

**Program Implementation**

Schools were phoned on a monthly basis to ensure that the quality of program implementation was high. Numerous site visits were also conducted by research staff
and representatives from the Peer Support Foundation to explain the requirements of
the program; assess the motivation and commitment of teachers involved in the
project; as well as answer any questions and concerns.

Research Design

To address the specified aims and hypotheses of the present study (see
Chapter 4), a pre-test, post-test, and follow-up design was utilised with experimental
and control groups. Data was collected from all incoming Year 7 students and from
older Year 10/11 students across two cohort years: 2001 and 2002. In 2001, all Year
7 students from three secondary schools were assigned to the control group. Year 10
students from two of these schools, and Year 11 students from one of these schools,
formed the senior control group. In 2002, new Year 7 students from the same three
schools participated in the peer support program and thus, formed the experimental
group. Data was also collected from all Year 10/11 students whereby those who
served as peer support leaders formed the experimental group, while the remainder
formed the second senior student control group. The same measures were completed
by control and experimental group participants, with the exception of student
evaluations of the program (which were only completed at Time 2 Year 2 by
program participants).

Study 1

Study 1 was designed to investigate the psychometric properties of the
measurement instruments utilised in the present research. A total of 2,335 secondary
school students from Years 7, 10 and 11 were administered the questionnaire battery
near the beginning of 2001 (Time 1 Year 1) and 2002 (Time 1 Year 2). The
instruments administered included the SDQII-S, ROPE, CSI-S, Support Scales,
APRI-A and School Enjoyment Scale.

Study 2

During 2001, the program was not implemented in the participating schools
and hence, students who were in Year 7 served as the within-school (baseline)
control group. These students completed questionnaires on three occasions during the
school year (near the start of the year, six months later, and towards the end of the
year). Students who were in Year 7 in 2002 participated in the peer support program and therefore, served as the experimental group. These students also completed questionnaires on three occasions, prior to the introduction of the program, at the end of the program and towards the end of the year. The aim was to parallel data collection times for the control group. Results for Year 7 students during the experimental year were compared with (a) the group of students from the previous (baseline) year, and (b) the pre-test results from the experimental group immediately prior to the intervention at Time 1. This design also provides a basis for analysing the short-term and enduring effects of the intervention.

**Study 3**

During 2001, all Year 10 and Year 11 students (Two schools Year 10 and one school Year 11) completed questionnaires on three occasions during the school year (near the start of the year, six months later, and towards the end of the year). These students served as the first within-school control group. In 2002, those students who served as peer support leaders formed the experimental group, while the remainder of Year 10/11 students formed the second within-school control group. These students also completed questionnaires on three occasions, prior to the introduction of the program, at the end of the program and towards the end of the year. Results for the peer support leaders during the experimental year were compared with (a) the group of students from the previous year (control group 1), (b) the group of students within the same year who did not serve as a peer support leader (control group 2), and (c) the pre-test results from the experimental group immediately prior to the intervention at Time 1. As with Study 2, this design provides a basis for analysing the short-term and enduring effects of the intervention on the peer support leaders.

**Study 4**

Study 4 was designed to identify students’ perceptions of the strengths and weaknesses of the intervention, using a combination of quantitative and qualitative approaches. At Time 2 Year 2, Year 7 students and peer support leaders from the experimental groups in Studies 2 and 3 completed a student evaluation questionnaire containing both quantitative and open-ended questions. Students from the
experimental groups were also invited to take part in discussion groups to further explore students’ perspectives of the peer support program.

**Data Analysis**

The quantitative data were analysed using SPSS for Windows, LISREL 8.52 (Jöreskog & Sörbom, 2002) and MLwiN 1.20 (Rasbash, Browne, Healy, Cameron, & Charlton, 2002).

**Data Analysis for Study 1**

**Reliability of the measurement instruments.** Reliability refers to the measurement consistency of a test (Anastasi & Urbina, 1997). In most research, the primary method for estimating reliability has been through computation of internal consistency. Internal consistency is based on the stability of item responses on each of the instrument’s scales. A common procedure for determining internal consistency is the computation of Cronbach’s Alpha. This procedure was used to calculate the reliability of each of the 31 scales used in the present study. There is no universal consensus about what is an acceptable level of reliability. Although there are ambit suggestions based on intuition and accepted wisdom that internal consistency reliability should be above .70 or .80 (Anastasi & Urbina, 1997; Weiten, 2001), there is general agreement the higher the reliability coefficient the better. For the present study, coefficients greater than .90 were considered to be excellent, .80 were considered to be good and .70 acceptable.

**Factor structure of the measurement instruments.** A series of confirmatory factor analyses (CFA) were conducted to assess the factor structure of the measurement instruments. The raw data were used as input to PRELIS (Jöreskog & Sörbom, 2002), where a covariance matrix was produced and subsequently analysed using LISREL 8.52 (Jöreskog & Sörbom, 2002). This program is probably the most widely used statistical program to test the fit between a sample covariance matrix and a hypothesised matrix.

In CFA, the researcher postulates relations between the observed measures and the underlying a priori factors, based on theory and/or empirical research, and then tests the hypothesized structure statistically (Byrne, 1998). In the models tested, each measured variable was permitted to only load on the one factor it was proposed
to reflect by constraining all other correlations and uniquenesses (residuals for each measured variable) to zero. The maximum likelihood method of estimation was used for each of the models; it is robust in relation to violations of assumptions of normality, particularly in relation to parameter estimates (factor loadings, factor correlations, path coefficients, etc.) which are of primary concern in this thesis (Hu, Bentler, & Kano, 1992; Jöreskog & Sörbom, 1993).

The LISREL program produces a range of goodness of fit indices. The chi-square value is a likelihood ratio test statistic that evaluates the fit between the restricted hypothesised model and the unrestricted sample data. The model may be rejected if the chi-square value is large relative to the degrees of freedom and accepted if the value is non-significant or small. However, for very large sample sizes, there is a high risk of relatively good-fitting models being rejected on the basis of the chi-square test (Bentler & Bonett, 1980; Marsh, 1994a; Marsh, Balla, & McDonald, 1988). Following Marsh, Balla, & Hau (1996) and Marsh et al. (1988) the Tucker-Lewis index (TLI), the relative noncentrality index (RNI), and root mean square error of approximation (RMSEA) were emphasised to evaluate goodness of fit, as they provide a relatively nonbiased indication of fit for large sample sizes. However, the chi-square test statistic is also presented, as well as an evaluation of parameter estimates. The TLI and RNI yield values ranging from zero to 1.00, with values greater than .90 and .95 being indicative of acceptable and excellent fit to the data (Marsh et al., 1996; Schumacker & Lomax, 1996). For RMSEA’s, values less than .05 indicate good fit, and values as high as .08 represent reasonable errors of approximation in the population (Browne & Cudeck, 1993; Jöreskog & Sörbom, 1993).

CFA’s were conducted separately for each instruments included in the test battery. These analyses were followed by a large CFA that included scales from all instruments in the one model. This model was used to assess the factor structure and degree of discrimination between scales (a total of 31 scales, based on response to 127 items, were included in this analysis).

**Age-related structural differences.** CFA was used to test for the equivalence of structural solutions for younger (Year 7) and older (Years 10/11) students. Tests of factorial invariance essentially involve carrying out a succession of models, where any one, any set, or all parameters are held invariant to be equal across groups (see
Jöreskog & Sörbom, 1993; Marsh, 1994a). The models are typically evaluated in terms the chi-square difference test or variation in the goodness of fit indices across the series of models. However, the chi-square difference test is subject to the same limitations as the chi-square test and accordingly, is highly sensitive to sample size. As a result, focus was placed upon the TLI, RNI and RMSEA. Relatively invariant goodness of fit indices across the series of models were considered to provide support for an invariant factor structure. The minimum condition for factorial invariance is the equivalence of the factor loadings across groups (Marsh et al., 1998).

Following recommendations by Marsh (1994a), the present analyses examined the comparative fit indices for five models across the two age groups. The first model was the least restrictive with no between-group invariance constraints placed on the estimated parameters. This initial baseline model is typically refereed to as the “totally noninvariant” model as there are no invariance constraints on the estimated parameters. The second model held the factor loadings invariant across groups; the third held both the factor loadings and uniquenesses invariant; the fourth held the factor loadings, factor variances and covariances invariant; and the fifth model was the most restrictive with all parameters (factor loadings, uniquenesses, factor variances and covariances) invariant across groups.

**Missing data.** Missing data are an inevitable problem for large-scale studies such as the present investigation. Nevertheless, there were little missing data present in Study 1 (0.31% of 283083 responses by 2229 students to 127 variables). A growing body of research emphasises potential problems with traditional pairwise, listwise and mean substitution approaches to missing data (e.g., Brown, 1994; Gold & Bentler, 2000; Graham & Hoffer, 2000). Instead the Expectation Maximization (EM) algorithm, which currently represents the most practical state of the art procedure to imputation for missing data (Schafer & Graham, 2002), was implemented as operationalised in the missing value routine in SPSS.

**Data Analysis for Study 2 and Study 3**

Multilevel modelling procedures were used in the present thesis to investigate the effects of the program on Year 7 students and the peer support leaders. The multilevel analyses were conducted using MLwiN version 1.20 (Rasbash et al.,
2002). Given that multilevel modelling is a relatively new data-analytic approach, a detailed introduction of its history, advantages and implementation in the present thesis is presented below.

**Introduction to multilevel modelling.** Multilevel modelling (also known as hierarchical linear modelling) has emerged over the past decade as a highly flexible and useful approach to analysing hierarchically structured data (Goldstein, 1995; Kreft & De Leeuw, 1998; Snijders & Bosker, 1999). This relatively new data-analytic approach is increasingly being utilised by researchers from a wide range of disciplines (see Goldstein, 1995, for a detailed review). Hierarchical data structures are particularly common in the social and behavioural sciences. In educational studies, for example, data typically has a multilevel structure in which students are nested or clustered within classes; classes are clustered within schools; and perhaps schools may be clustered within local authorities or school boards. Longitudinal school studies can also be considered to be hierarchically structured with repeated measurements at the first level, which are nested within students at the second level.

Previous studies largely ignored the hierarchical structure of their data, which in large part reflected the underdevelopment of conventional statistical techniques for the estimation of data with hierarchically nested structures (Raudenbush & Bryk, 2002). Only recently have software tools, such as HLM (Bryk, Raudenbush, & Condon, 1996) and MLWin (Rasbash & Woodhouse, 1995), been developed to analyse such data. As pointed out by Goldstein (1995), the existence of data hierarchies is neither "accidental nor ignorable" (p. 1). Students within the same school, for example, are typically more similar to each other that they are to students from different schools. To ignore this relation risks overlooking the importance of group effects and could also violate the assumption of independence of statistical tests that do not take the multilevel structure into account (Goldstein). In this situation, the standard errors of conventional statistical tests are underestimated, which could result in significant results where none should exist (Heck & Thomas, 2000; Hox, 1995).

Older approaches to the analysis of multilevel data typically involved the aggregation or disaggregation of data to one single level of analysis before the application of standard analysis procedures (Hox, 1995, 1998). The main difficulty with such an approach is that relations observed at one level may not bear any
straightforward relation to relations observed at another level (e.g., Goldstein, 1997; Hox, 1995; Snijders & Bosker, 1999). For example, relations at the school level may be very different from those found at the student level. Another major difficulty with this approach is its inability to model random coefficients (Goldstein, 1997). For this reason, one cannot determine whether relations are the same for different kinds of students or whether they vary from school to school. Analyses which ignore such differences, and in particular make cross-level inferences based only on aggregate or disaggregate level analyses, are not only incomplete, but can be highly misleading (See Hox, 1995, and Pedhazur, 1982, for a detailed review of the dangers of making cross-level inferences).

In the past, researchers have also encountered problems with the analysis of repeated measures data, as conventional statistical procedures require balanced data to obtain efficient estimates (Ware, 1985). In practice, however, participants are assessed irregularly, some of them a number of times and others perhaps only once (Goldstein, 1995). An important advantage of the multilevel approach to repeated measures data is its flexibility to deal with unbalanced data structures (Goldstein, 1995; Raudenbush & Chan, 1993; Snijders & Bosker, 1999). This approach does not require all participants to have the same number of data points over time and, therefore, provides an efficient approach to the common problem of missing data in longitudinal research.

In summary, multilevel modelling is advantageous over traditional statistical procedures because it allows researchers to simultaneously consider multiple units within the same analysis, as well as avoid the problems related to dependence, aggregation bias and unbalanced data structures. For the present investigation, the data were conceptualised as a three-level model, consisting of time at the first level, student at the second level and school at the third level (see Figure 5.1). Multi-level modelling is particularly useful in this case as the same statistical models could be used to estimate overall program effects, as well as whether the degree of the effect in a particular school deviated from the overall average.
Baseline variance components model or intercept-only model. A “baseline variance component model” (Rasbash et al., 2002) or “intercept-only model” (Hox, 1995) was used to evaluate how much variation in each of the outcome measures were allocated across the three different levels. This 3-level model is expressed in MLwiN as follows:

\[
y_{ijk} \sim N(\ XB, \ \Omega) \\
y_{ijk} = \beta_0 + \gamma_{0i} + \mu_{0k} + \epsilon_{ijk}
\]

\[
\beta_{0jk} = \beta_0 + \gamma_{0i} + \mu_{0k} + \epsilon_{zijk}
\]

\[
\begin{bmatrix}
\gamma_{0i} \\
\mu_{0k} \\
\epsilon_{zijk}
\end{bmatrix} \sim N(0, \ \Omega_i) : \ \Omega_i = \begin{bmatrix}
\sigma_{\gamma}^2 \\
\sigma_{\mu}^2 \\
\sigma_{\epsilon}^2
\end{bmatrix}
\]

In this model, \( y_{ijk} \sim N(\ XB, \Omega) \) is the standard notation for a normally distributed response variable with the fixed part of the model, XB, and variances and covariances of the random terms over all levels of the data, \( \Omega \). In the current study, \( y_{ijk} \) is the outcome measure for individual \( j \) of the \( k \)th school at time \( i \). The intercept, \( \beta_{0jk} \), is the mean across all waves, students and schools. When standardised ratings are used, \( \beta_{0jk} \) is zero. The term \( x_0 \) is a constant column or a vector of ones and it is typically denoted as “cons” (\( x_0 \) is a special explanatory variable, which takes the
value 1 for all ratings). The residual, $v_{0k}$, is the random school effect, which is the departure of school $k$'s intercept from $\beta_{0ijk}$ (the subscript 0 indicates that it is attached to $x_0$). The term, $u_{0ijk}$, represents the random student effect (the deviation of student $jk$'s score from $\beta_{0ijk}$) and the term $e_{ijk}$, the random time effect (the deviation of wave $ijk$'s score from the grand mean).

$\beta_0$ constitutes the "fixed" part of the model, and its effects are assumed to be constant and without measurement error. On the other hand, the "random" parts of the model, $v_{0j}$, $u_{0ij}$ and $e_{0ijk}$, are not considered to be constant and are measured with sampling error. These residuals are assumed to be normally distributed with a mean of zero and a variance of $\sigma^2_{v0}$, $\sigma^2_{u0}$ and $\sigma^2_{e0}$, respectively. Variance components can also be used to compute the intraclass correlation—that is the proportion of group level variance compared to the estimated total variance. The intra-school correlation, for example, would be calculated using formula (2). For example, if relative to the total variation, $\sigma^2_{v0}$ is small then it could be deduced that schools had little effect on the outcome measure.

$$\rho = \frac{\sigma^2_{v0}}{\sigma^2_v + \sigma^2_{u0} + \sigma^2_{e0}} \quad (2)$$

**Variance components model with explanatory variables.** The baseline model (1) can be extended by including one or more explanatory variables. A model incorporating one explanatory variable can be conceptualised as:

$$y_{ijk} \sim N(\mathbf{Xb}, \mathbf{\Omega})$$

$$y_{ijk} = \beta_{0ijk} x_{ij} + \beta_{1ijk} x_{ik}$$

$$\beta_{0ijk} = \beta_{0} + \nu_{0k} + u_{0ijk} + e_{0ijk} \quad (3)$$

$$\begin{bmatrix} \nu_{0k} \\ u_{0ijk} \\ e_{0ijk} \end{bmatrix} \sim N(0, \mathbf{\Omega}) : \Omega_0 = \begin{bmatrix} \sigma^2_{v0} \\ \sigma^2_{u0} \\ \sigma^2_{e0} \end{bmatrix}$$

95
In this model, $x_{ijk}$ represents the individual explanatory variable and $\beta_1$ constitutes the regression slope for $x_{ijk}$. Here, the explanatory variable is fixed, which means that the corresponding variance components of the slope are fixed to zero. The terms, $\nu_{ij}$, $u_{ij}$, and $e_{ijk}$, represent random school, individual, and time effects, respectively. These random effects are assumed to be normally distributed so that it is sufficient to estimate their variances, $\sigma^2_{\nu 0}$, $\sigma^2_{u0}$ and $\sigma^2_{e0}$.

**Multilevel, longitudinal path models.** The major focus of the multilevel analyses in the present research was on a set of multilevel, longitudinal path models to test the effects of participation in the peer support program on change in various outcome measures. For Study 2 and Study 3, the major analyses consisted of a three-level model, with time at the first level, individual student at the second level, and school at the third level. The data was arranged so that the two post-intervention test occasions (Time 2 and Time 3) were specified at the first level and Time 1 measures were treated as covariates in models examining the effects of the program. Using this approach, outcome measures were controlled for Time 1 measures to assess residual change that could then be related to other variables. Goldstein (1995) refers to this as the "conditional" approach, noting that earlier measures are treated as covariates so that the approach is often appropriate when data are available from a small number of discrete occasions. In a recent study conducted by Marsh, Hau and Kong (2002) the conditional approach was found to be particularly well suited to evaluating the presence and causes of change.

**Data transformations and interaction effects.** Several data transformations were conducted so that the effects found in the multilevel analyses could be easily interpretable (Hox, 1995; Raudenbush & Bryk, 2002). Following the advice of Marsh and Rowe (1996), all Time 1 scale scores were standardised to have a mean of zero and a standard deviation of one. Time 2 and Time 3 variables were standardised in terms of the mean and standard deviation at Time 1 so that the change over time was not lost through standardisation. The products of individual standardised variables were calculated to test interaction effects. The product terms were not re-standardised. Other explanatory variables, such as Group (Study 2: $1 =$ control, $2 =$ experimental) and Time (Time 2 = 1, Time 3 = 2), were also standardised to assist with the interpretation of results. The product of individual standardised variables
was to construct interaction effects. The product terms that were formed were not re-standardised.

Although there is still the issue of how to interpret the “meaningfulness” of standardized regression coefficients, this is a broadly recognized effect size metric and the problem is not specific to the multilevel modelling approach used in this the present investigation. However, researchers are cautioned that there are some analyses in which it would be inappropriate to standardize variables or when interpretation of effects based on standardized may be misleading, as is the case with ordinary (single level) multiple regressions (for further discussion, see Aiken & West, 1991).

**Estimation procedure.** Iterative generalised least squares (IGLS) was the procedure used to estimate the fixed and random parameters of all multilevel models in Studies 2 and 3. IGLS is the default method of estimation in MLwiN and is based on iterative procedures. This method finds point estimates for the unknown parameters of interest in the model. The process involves iterating until the estimates for all parameters do not change from one cycle to the next and, hence, convergence has been achieved (see Goldstein, 1995 for detailed review of the IGLS procedure).

**Significance of parameters.** The statistical significance of fixed parameters was evaluated using the Wald statistic (Hox, 1995), which examines the ratio of a parameter estimate to its standard error. For a large random sample, the ratio of a fixed parameter to its standard error is approximately normally distributed with mean 0 and variance 1. The ratio of the parameter estimate to its standard error gives the critical “t” value to test the significance of the parameter estimate. If this ratio is greater than 1.96 (the critical value under normal distribution) then the parameter estimate is significantly different from zero (Hox, 1995; Quené & Bergh, 2002).

**Missing data.** Missing data is an unavoidable problem for large-scale longitudinal studies such as the present investigation. However, there was little missing data present in Study 2 at either Time 1 (0.35% of 28,830 scales scores by 930 students to 31 scales), Time 2 (0.61% of 28,830 scales scores by 930 students to 31 scales) or Time 3 (0.90% of 28,830 scales scores by 930 students to 31 scales). There was comparatively more missing data for Study 3, though the quantity of missing data was by no means sizeable [Time 1 (0.64% of 26598 scales scores by
858 students to 31 scales); Time 2 (1.09% of 26598 scales scores by 858 students to 31 scales); and Time 3 (1.54% of 26598 scales scores by 858 students to 31 scales)]. Since Time 1 scores were used as a covariate in Studies 2 and 3, students without a Time 1 score were not included in analyses.

Further detailed specific methodology unique to Study 2 and Study 3 is presented in the following sections.

*Examining the impact of the peer support program on Year 7 students.*

Three models were used to compare the effects of the test condition (experimental versus control) on change in each of the outcome measures. Model 1 was a baseline variance components model which was used to estimate how much of the variation in each of the dependent variables could be allocated across school (level 3), individual students (level 2), and time (level 1). Variance components were also used to compute the interclass correlation—that is the proportion of group level variance compared to the estimated total variance.

In Model 2, four variables were added to the baseline variance components model. These included the corresponding Time 1 outcome measure, Time (Time 2 and Time 3), Group (Experimental and Control), as well as the Group by Time interaction. Here the parameter estimates for Group and the Group x Time interaction were of prime importance. The estimate for Group was used to test the effect of the program across Time 2 and Time 3 (i.e., the average score across the post-intervention test occasions) for a particular outcome measure, while controlling for the corresponding Time 1 outcome. As Group were standardised to have $M = 0$ and $SD = 1$, the direction of the parameter estimate was used to determine the group of students (i.e., experimental or control) who higher than the other. A significant result in the positive direction would indicate that across Time 2 and Time 3 students in the experimental group scored higher on a particular outcome measure than students in the control group. Alternatively, a significant result in the negative direction would suggest that students in the experimental group scored lower on particular outcome measure than students in the control group. A non-significant result would imply that across Time 2 and Time 3 scores on the outcome measure were not significantly different for students in the experimental and control groups.
The group by time interaction was used to test the stability of outcomes between Time 2 and Time 3. Stable effects would be demonstrated by the presence of a non-significant interaction effect, which would indicate that the effect of the intervention did not differ significantly from Time 2 (immediate post-test) to Time 3 (follow-up). For all "positive" scales (i.e., scales where high scores are more desirable than low scores), a significant result in the negative direction would suggest that the beneficial effects of the intervention at Time 2 were not maintained at Time 3. On the other hand, for these scales, a significant result in the positive direction would show that the effect of the intervention became more evident at Time 3 than Time 2, and hence, suggest the possibility that a delayed positive effect (i.e., a sleeper effect) had occurred.

Model 3 included the addition of three new interaction terms. These included the interaction between (a) the corresponding Time 1 outcome measure and Time (T1 x Time); (b) the corresponding Time 1 outcome measure and Group (T1 x Group); and (c) and the three-way interaction between the corresponding Time 1 outcome measure, Time and Group (T1 outcome x Time x Group). This model was designed to test whether students with lower Time 1 scores displayed higher gains on a particular outcome measures across Time 2 and Time 3 than students with higher T1 scores (an aptitude-treatment interaction effect).

Further analyses were also conducted to determine whether the effects of the program varied from one peer support group to another. These analyses were conducted with the experimental group data only and began with a four-level model, consisting of school at the fourth level, peer support group at the third level, student at the second level, and time at the first level. However, for a number of the dependent variables, the inclusion of 4 levels in the model meant that some of the computations did not converge. According to Hox (1995), non-convergence often occurs when one tries to estimate too many random (variance) components that are actually close or equal to zero. The results from the non-converged solution indicated that the smallest amount of variation for the experimental group data was at the school level. To rectify the problem, the model was simplified by fixing the effects at the school level. Consequently, these models estimated variance components for peer support group, individual student, and time.
Examining the impact of the program on peer support leaders. A major focus of the analyses for Study 3 was on models used to compare the effects among the experimental and two control groups on change in each of the outcome measures. Three sets of contrasts were employed to test for differences between the participating groups. The coefficients formulated for these contrasts are presented in Table 5.8. Each of these contrast sets can be considered to be orthogonal because the cross-product of their coefficients sums to zero (Rosenthal, Rosnow, & Rubin, 2000).

The first contrast in Set 1 was of primary importance as it tested whether the experimental group differed significantly from the average of the control groups [exp - (mean c1 and c2)]. A significant result in the positive direction would indicate that students in the experimental group scored higher on a particular outcome measure than the average score of those in the control groups. Alternatively, a significant result in the negative direction would suggest that the experimental group scored lower on a particular outcome than the average of two control groups. A non-significant result would imply that scores on the outcome measure were not significantly different for students in the experimental and control groups. For the intervention to have had any impact on a particular outcome, it was important to find a significant result on this first contrast. Whether a positive or negative parameter estimate was required depended on whether a higher or lower score was more favourable on the particular outcome being examined.

The second contrast in Set 1 was also critical because it was used to test for differences between the two control groups. Here, it was important to establish that there were no significant differences between control group 1 (C1) and control group 2 (C2).

Where a significant result was found for the first contrast in Set 1, it was important to ascertain that the scores for the experimental group were significantly more favourable than each of the two control groups in separate analyses. This is where the results from contrasts four (Set 2) and six (Set 3) became important. The fourth contrast tested for differences between the experimental group and C2, while the sixth tested for differences between the experimental group and C1. For the intervention to have had any impact on a particular outcome, it was important to find a significant result on these two contrasts. The third and the fifth contrast were not of
any particular importance, but included in the analysis so that the contrast sets were orthogonal.

Table 5.8.

*Orthogonal Contrast Sets Employed in Study 3*

<table>
<thead>
<tr>
<th>Set</th>
<th>Description</th>
<th>Exp 2002</th>
<th>C1 2001</th>
<th>C2 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1: exp - (mean c₁ and c₂)</td>
<td>2</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>2: c₁ - c₂</td>
<td>0</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3: (mean exp and c₂) - c₁</td>
<td>1</td>
<td>-2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4: exp - c₂</td>
<td>1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>3</td>
<td>5: c₂ - (mean exp and c₂)</td>
<td>-1</td>
<td>-1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6: exp - c₁</td>
<td>1</td>
<td>-1</td>
<td>0</td>
</tr>
</tbody>
</table>

*Data Analysis for Study 4*

To examine students’ perceptions of the strengths and weaknesses of the peer support program, a combination of quantitative and qualitative approaches was employed.

*Quantitative component.* Students’ responses were converted to a four-point scale to synthesise response categories. The frequency of their responses to each of the questionnaire items was then examined using SPSS.

*Qualitative component.* Content analysis was used to group the qualitative information into a small number of sets of themes or constructs. Separately, two researchers systematically identified themes within the data and assigned them to categories. The results were then compared and discussed until the generated themes were agreed upon (Patton, 1990) (see Chapter 5). This procedure was applied to ensure that the generated themes were identified and clustered in a way that was consistent with the views of more than one person and not simply a reflection of one researcher’s subjective interpretation. Concordance between the two researchers was over 90% on all questions.
Summary

Four studies were designed to specifically address the research aims, hypotheses and research questions of the present research. In this chapter, the methodology used for the collection of data for the four studies, as well as the principles underlying their design and data analysis has been described in detail. Major methodological limitations that have pervaded previous research were avoided by (a) employing a strong longitudinal quasi-experimental design with control groups and baseline data against which to compare the effects, (b) utilising standardised instruments with sound psychometric properties, (c) including a large sample size and participation from several secondary schools, (d) employing the strongest available statistical analysis tools, and (e) incorporating a synergetic blend of quantitative and qualitative research methods to investigate students perceptions of the program. This chapter clearly demonstrated that a strong and suitable methodology was devised for the present research.
CHAPTER 6

STUDY 1 RESULTS: PSYCHOMETRIC PROPERTIES OF THE MEASUREMENT INSTRUMENTS

Introduction

Over the past decade, there has been increasing interest in the development of empirically supported interventions in psychology and education (Kratochwill & Stoiber, 2000). However, research in this area continues to be plagued by anecdotal evaluations and the use of instrumentation with unsubstantiated psychometric properties. These methodological issues could well be the cause of disappointing or inconsistent results found in previous intervention research (Gerber & Terry-Day, 1999). Neill et al. (2001) identified that educators are often “personally convinced that their programs are achieving valuable benefits for students, which may well be the case, but methodological problems of off-the-shelf instrumentation may produce an empirical non-result” (p.4). In order to improve intervention research, it is critical that researchers select appropriate instrumentation and apply sound research design (Zaslow & Takanishi, 1993). Study 1 was specifically designed to address these needs and advance current research practice by identifying, developing and evaluating psychometrically sound measurement instruments for use with secondary school students. A number of existing as well as newly developed measures were rigorously evaluated to ensure that they provided a sound empirical basis upon which the effectiveness of the peer support program could subsequently be examined.

The instruments examined in this chapter were designed to assess psychological outcomes in a variety of domains including self-concept, life effectiveness, coping strategies, perceptions of bullying, social support and enjoyment of school. The results were based on Time 1 responses of participants from both the experimental and control year. Participants consisted of 2,335 Year 7, 10, and 11 students from five secondary schools (see Chapter 5 for a comprehensive description of the methodology for Study 1).

The results include assessments of internal consistency and multidimensional factor structure. The factor structure of each instrument was obtained through confirmatory factor analysis. Tests of invariance between age cohorts based on
confirmatory factor analysis have also been reported and correlations between each of the scales are discussed.

Overview of Analyses

Each instrument being examined in this chapter was hypothesised to be psychometrically strong in terms of its reliability (Hypothesis 1.1) and factor structure (Hypothesis 1.2). Coefficient alphas for each of the instruments’ subscales were used to estimate internal consistency. Coefficients were calculated for the total participants, and separately for the Year 7 and Year 10/11 cohorts. The factor structure of each instrument was evaluated using confirmatory factor analysis (CFA). After each instrument was examined separately, a final, very large CFA was conducted that included scales from all instruments in the one model. This model was used to assess the factor structure and degree of discrimination between scales (a total of 31 scales, based on responses to 127 items, were included in this analysis). Support for the hypothesised factor structure across all instruments considered in a particular study requires that every scale be included in a single overarching CFA, though to date, published examples of CFA’s inclusive of multiple instruments are extremely rare. For separate CFA analyses on any one instrument which confidently show that items load only on the factors that they are designed to measure and that the different factors are clearly distinguishable there is no guarantee that this will continue to be the case when many different instruments are incorporated in the one analysis (see Marsh, 1994b; Marsh, Craven, Hinkley, & Debus, 2003).

CFA’s were also conducted to examine age-related differences in the structure of the measurement instruments. These analyses were necessary to ensure that the instruments were appropriate for use with both younger and older secondary school students. Analyses were carried out on separate covariance matrices for Year 7 and Year 10/11 students. Five models were tested in which aspects of the factor structure were systematically held invariant across the two groups. Fit indices (TLI, RNI, and RMSEA) were assessed when elements of these structures were constrained (see Chapter 5 for further details on the statistical techniques applied in this chapter). The structure of the instruments was predicted to be invariant across age (Hypothesis 1.3).
The results for this chapter have been organised so that the psychometric properties for each separate instrument are presented first, followed by the statistics produced from the 31-factor CFA and examination of the correlations between scales.

**Psychometric Properties of the SDQII – S**

The new short form of the SDQII (the SDQII-S) developed by Marsh et al. (in press) was selected for the present study to assess multiple dimensions of self-concept (see Chapter 5). As this was the first large-scale test of the SDQII-S, it was critical that the psychometric properties of this new instrument be thoroughly evaluated.

**Internal Consistency Estimates**

Internal consistency estimates of the 11 domain-specific scales of the SDQII-S are presented in Table 6.1. For the total sample of participants, internal consistency estimates were good to excellent (range = .79 to .91), with a median alpha coefficient of .83. The emotional stability scale had the lowest internal consistency estimates (.79 for total participants), which is consistent with recent findings on the SDQII-S (Marsh, Ellis, et al., in press), as well as with previous results found for the longer version of the instrument (SDQII; Marsh, 1990). The internal consistency estimates are slightly higher for the Year 10/11 students (median $\alpha = .85$) than Year 7 students (median $\alpha = .82$), but these differences are not large. However, this small difference is consistent with previous SDQ research that has found that reliability estimates tend to increase with age (Marsh, 1989; Marsh, Craven & Debus, 1998). Overall, the internal consistency estimates provide reasonable support for the SDQII-S responses. Although age differences were found in the reliabilities of the specific scales, the estimates for the Year 7 students were acceptable on each of the 11 scales.
Table 6.1

Internal Consistency Coefficients for the SDQII-S at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each of the Self-Concept Scales

<table>
<thead>
<tr>
<th>Self-Concept Scale</th>
<th>Coefficient Alpha</th>
<th></th>
<th>Total</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 7 (n=1191)</td>
<td>Year 10/11 (n=1038)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscales:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>.75</td>
<td>.86</td>
<td>.81</td>
<td>4</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>.88</td>
<td>.90</td>
<td>.90</td>
<td>4</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>.78</td>
<td>.83</td>
<td>.80</td>
<td>5</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>.85</td>
<td>.82</td>
<td>.84</td>
<td>4</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>.80</td>
<td>.82</td>
<td>.81</td>
<td>6</td>
</tr>
<tr>
<td>Parent Relations</td>
<td>.74</td>
<td>.85</td>
<td>.82</td>
<td>4</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>.79</td>
<td>.79</td>
<td>.79</td>
<td>5</td>
</tr>
<tr>
<td>Verbal</td>
<td>.90</td>
<td>.92</td>
<td>.91</td>
<td>5</td>
</tr>
<tr>
<td>Math</td>
<td>.89</td>
<td>.90</td>
<td>.90</td>
<td>4</td>
</tr>
<tr>
<td>School</td>
<td>.82</td>
<td>.86</td>
<td>.84</td>
<td>4</td>
</tr>
<tr>
<td>Global Esteem</td>
<td>.82</td>
<td>.85</td>
<td>.83</td>
<td>6</td>
</tr>
<tr>
<td>Median reliability score</td>
<td>.82</td>
<td>.85</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td>Mean reliability score</td>
<td>.82</td>
<td>.85</td>
<td>.84</td>
<td></td>
</tr>
</tbody>
</table>

Factor Structure

The a-priori 11 factor model provided a good fit to the data, with a TLI of .95, RNI of .96 and RMSEA of .070 (chi-sq = 10947.33, df = 1169). Furthermore, the factor loadings indicate that all 11 factors are well-defined (see Table 6.2). Each factor loading is statistically significant and generally substantial in size (range = .59 to .94; median = .78).

The factor correlations provide an indication of the distinctiveness of the factors (see Table 6.2). Correlations among the factors range from .01 to .75 (median r = .32). Over 60 percent of the correlations are less than .40. These statistics provide reasonable support for the distinctive nature of each factor. In accordance with previous research (Marsh, Parker, & Barnes, 1985), the highest correlations tended to occur between global self-esteem and other scales (median = .50). Correlations among the 11 factors are also consistent with the hierarchical ordering of self-concept as hypothesized by the Marsh/Shavelson (Marsh & Shavelson, 1985) model. In concordance with this model, the seven non-academic factors (physical ability, physical appearance, same-sex relations, opposite-sex relations,
honesty/trustworthiness, parent relations and emotional stability) are generally more highly correlated with each other (median $r = .32$) than with the three school scales (verbal, math, general school; median $r = .20$). Furthermore, the correlations between the mathematics and general school scales ($r = .67$), as well as the verbal and general school scales ($r = .67$) are substantially higher than correlations between these three academic factors and the seven non-academic factors (median $r = .20$). In correspondence with the Marsh/Shavelson (1985) model and previous research (Marsh, Byrne & Shavelson, 1988; Marsh, Parker, et al., 1985), verbal and mathematics self-concept are not highly correlated ($r = .19$).

Table 6.2

<table>
<thead>
<tr>
<th></th>
<th>Phys</th>
<th>Appr</th>
<th>Sm Sx</th>
<th>Op Sx</th>
<th>Hon</th>
<th>Pnt</th>
<th>Emtn</th>
<th>Ver</th>
<th>Math</th>
<th>Schl</th>
<th>Genl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor Loadings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.89</td>
<td>.88</td>
<td>.73</td>
<td>.63</td>
<td>.70</td>
<td>.84</td>
<td>.67</td>
<td>.73</td>
<td>.89</td>
<td>.69</td>
<td>.74</td>
</tr>
<tr>
<td>2</td>
<td>.97</td>
<td>.94</td>
<td>.68</td>
<td>.86</td>
<td>.74</td>
<td>.82</td>
<td>.65</td>
<td>.82</td>
<td>.93</td>
<td>.78</td>
<td>.82</td>
</tr>
<tr>
<td>3</td>
<td>.59</td>
<td>.81</td>
<td>.81</td>
<td>.91</td>
<td>.66</td>
<td>.86</td>
<td>.62</td>
<td>.87</td>
<td>.91</td>
<td>.87</td>
<td>.82</td>
</tr>
<tr>
<td>4</td>
<td>.73</td>
<td>.78</td>
<td>.82</td>
<td>.77</td>
<td>.78</td>
<td>.73</td>
<td>.62</td>
<td>.93</td>
<td>.74</td>
<td>.88</td>
<td>.73</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>.76</td>
<td>.64</td>
<td>.82</td>
<td>.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.67</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>.70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.63</td>
</tr>
<tr>
<td>Factor Correlations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phys</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appr</td>
<td>.37</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sm Sx</td>
<td>.37</td>
<td>.38</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Op Sx</td>
<td>.38</td>
<td>.46</td>
<td>.58</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hon</td>
<td>.10</td>
<td>.13</td>
<td>.32</td>
<td>.14</td>
<td>.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pnt</td>
<td>.28</td>
<td>.31</td>
<td>.39</td>
<td>.18</td>
<td>.42</td>
<td>.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emtn</td>
<td>.20</td>
<td>.27</td>
<td>.41</td>
<td>.33</td>
<td>.30</td>
<td>.23</td>
<td>.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ver</td>
<td>.11</td>
<td>.27</td>
<td>.25</td>
<td>.17</td>
<td>.32</td>
<td>.24</td>
<td>.17</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math</td>
<td>.12</td>
<td>.20</td>
<td>.13</td>
<td>.01</td>
<td>.21</td>
<td>.20</td>
<td>.15</td>
<td>.19</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schl</td>
<td>.16</td>
<td>.34</td>
<td>.33</td>
<td>.18</td>
<td>.41</td>
<td>.39</td>
<td>.25</td>
<td>.67</td>
<td>.67</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Esteem</td>
<td>.45</td>
<td>.60</td>
<td>.55</td>
<td>.37</td>
<td>.50</td>
<td>.58</td>
<td>.36</td>
<td>.49</td>
<td>.45</td>
<td>.75</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Note. Self-concept factors are: Phys = Physical Ability, Appr = Physical Appearance, Sm Sx = Same-Sex Relations, Op Sx = Opposite-Sex Relations, Hon = Honesty/Trustworthiness, Pnt = Parent Relations, Emtn = Emotional Stability, Ver = Verbal, Schl = School, and Esteem = Global Esteem. For the 11 factor a priori model, each factor was inferred on the basis of four to six measured variables (indicated as 1-6 in the upper left column). Each measured variable was allowed to load on only the factor that it was designed to measure and all other factor loadings were constrained to be zero. Non-zero (freely estimated) factor loadings are presented but factor loadings constrained to be zero are excluded. All factor loadings for measured variables are statistically significant.
In summary, the results from this first large-scale study on the SDQII-S provide strong support for the 11 factors for which the instrument was designed to measure. The fit indices and factor loadings were good and the factor correlations indicated reasonable discrimination between the scales. These results demonstrate the sound psychometric properties of the new short form of the SDQII in assessing multiple dimensions of self-concept and offer further support for the theory on which it is based.

**Factor Invariance Across Age**

Tests of factor invariance for the SDQII-S involved an examination of the comparative fit indices for five models across Year 7 and Year 10/11 students. The first model contained no invariance between the groups (NO IN); the second model held the factor loadings invariant (LOAD=IN); the third held the factor loadings, the factor variances and covariances invariant (LOAD=IN, VAR/COV=IN); the fourth held the factor loadings and the uniquenesses invariant (LOAD=IN, UN=IN); and the fifth model was the most restrictive with all parameters (factor loadings, uniquenesses, factor variances and covariances) invariant (LOAD=IN, UN=IN, VAR/COV=IN). Relatively invariant fit indices across the five models are required to substantiate an invariant factor structure (Marsh, 1994).

**Table 6.3**

*Invariance Tests Across Age for the SDQII-S*

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>8128.70</td>
<td>2338</td>
<td>.96</td>
<td>.96</td>
<td>.052</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>8258.05</td>
<td>2378</td>
<td>.96</td>
<td>.96</td>
<td>.052</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>8603.32</td>
<td>2444</td>
<td>.96</td>
<td>.96</td>
<td>.053</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>9217.77</td>
<td>2429</td>
<td>.95</td>
<td>.96</td>
<td>.055</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>9575.30</td>
<td>2495</td>
<td>.95</td>
<td>.95</td>
<td>.056</td>
</tr>
</tbody>
</table>

*Note. IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Uniquenesses.*

Statistics generated from these five models across the two age groups for the 11 factor model are presented in Table 6.3. The fit of the first model (no-invariance model) was good (TLI = .96; RNI = .96; RMSEA = .052) and provides an important
basis of comparison for more restrictive models that impose invariance constraints. The results in Table 6.3 indicate that the introduction of invariance constraints produced only small changes in the fit indices across the five models. For the second and, perhaps, most critical between-group invariance model (Marsh, 1994a; Marsh, Hau, Chung & Siu, 1998), the fit indices (TLI = .96, RNI = .96, RMSEA = .052) were the same as those for Model 1, thus providing good support for the invariance of the factor loadings. In Model 3, the TLI and RNI are somewhat lower than for the no-invariance model. However, these differences are not considerable. Finally, the imposition of invariance for the uniquenesses (Model 4) and for all parameters (Model 5) still produced an acceptable fit (TLI = .95), but one that was lower than for the first 3 models. These results indicate that support was weakest for the invariance of the uniquenesses, which is consistent with the observation that reliabilities are somewhat higher for the older students (see Marsh, 1994a, for discussion on the correspondence between uniquenesses and reliability estimates). Nevertheless, as each of the models provides an adequate fit, the factor structure of the SDQII-S can be considered to be similar for Year 7 and Year 10/11 students.
Psychometric Properties of the ROPE

A new revised version of the ROPE developed by Richards and Neill (2000) was evaluated in the current study. This measure was designed to measure key psychological and behavioural domains that constitute "life fitness" or "life effectiveness" and intended to be sensitive to the types of personal changes likely to occur as a result of taking part in school intervention programs. Apart from preliminary pilot work conducted by Richards, Ellis and Neill (2000), this research project was the first large-scale application of the instrument and, consequently, it was imperative to test the strength of its psychometric properties.

Internal Consistency

Internal consistency estimates for each of the 12 scales (see Table 6.4) are good, ranging from .76 to .91 for the total sample of participants (median $\alpha = .85$). In general, the internal consistency estimates are somewhat higher for Year 10/11 students (median $\alpha = .86$) than Year 7 students (median $\alpha = .82$), particularly for the active involvement and overall effectiveness scales. Although age differences were found in the reliabilities of some of the scales, the estimates for the Year 7 students were acceptable on each of the 12 scales (range = .71 to .86). In summary, the internal consistency estimates provide reasonable support for the reliability of the ROPE.

Factor Structure

The a priori 12 factor model provided an excellent fit to the data, with a TLI of .99, RNI of .99 and RMSEA of .054 (chi square = 3724.98; $df = 528$). The factor loadings (see Table 6.5) demonstrate that the factor structure for this instrument was well-defined. Each factor loading is statistically significant and considerable in size (range = .70 to .93; median = .83). Although the factor correlations were moderate to strong (see Table 6.5), varying from .51 to .85 (median $r = .67$), none of the correlations approached 1.0. However, self-confidence was highly correlated with overall effectiveness ($r = .85$) and quality seeking ($r = .81$). Given that it makes sense that high self-confidence would be related to success in many areas in life and
substantive effort to be a high achiever, this correlation was acceptable from a substantive perspective.

Table 6.4

*Internal Consistency Coefficients for the ROPE at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Life Effectiveness Scale*

<table>
<thead>
<tr>
<th>Life Effectiveness Scale</th>
<th>Coefficient Alpha</th>
<th>Year 7 (n = 1191)</th>
<th>Year Grade (n = 1038)</th>
<th>Total (n = 2229)</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscales:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>.80</td>
<td>.83</td>
<td>.82</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>.86</td>
<td>.86</td>
<td>.86</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Stress Management</td>
<td>.80</td>
<td>.85</td>
<td>.83</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>.80</td>
<td>.80</td>
<td>.80</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Social Efficacy</td>
<td>.86</td>
<td>.88</td>
<td>.87</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td>.88</td>
<td>.89</td>
<td>.89</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Leadership Ability</td>
<td>.89</td>
<td>.91</td>
<td>.91</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Time Efficacy</td>
<td>.84</td>
<td>.86</td>
<td>.86</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Quality Seeking</td>
<td>.80</td>
<td>.83</td>
<td>.83</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Coping with Change</td>
<td>.85</td>
<td>.90</td>
<td>.88</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Active Involvement</td>
<td>.71</td>
<td>.80</td>
<td>.76</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>.79</td>
<td>.85</td>
<td>.83</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Median reliability score</strong></td>
<td>.82</td>
<td>.86</td>
<td>.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean reliability score</strong></td>
<td>.82</td>
<td>.86</td>
<td>.85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In summary, the results demonstrate that this instrument, which was specifically designed for evaluating program outcomes, is successfully able to identify the 12 “life effectiveness” factors for which it was designed to measure, as was indicated by the goodness of fit indices and factor loadings. Although some of the factor correlations were moderate to strong, none approached 1.0, and all were consistent with expectations. Hence, the factor correlations showed satisfactory discrimination between the factors. Clearly, these results demonstrate the strength of new version of the ROPE in assessing multiple dimensions of life effectiveness.
Table 6.5

Factor Structure for and Correlations among the ROPE Scales

<table>
<thead>
<tr>
<th></th>
<th>SC</th>
<th>SF</th>
<th>SM</th>
<th>OT</th>
<th>SE</th>
<th>CT</th>
<th>LA</th>
<th>TE</th>
<th>QS</th>
<th>CH</th>
<th>AI</th>
<th>OE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor Loadings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.76</td>
<td>.79</td>
<td>.78</td>
<td>.76</td>
<td>.84</td>
<td>.82</td>
<td>.92</td>
<td>.80</td>
<td>.75</td>
<td>.89</td>
<td>.83</td>
<td>.77</td>
</tr>
<tr>
<td>2</td>
<td>.78</td>
<td>.86</td>
<td>.83</td>
<td>.81</td>
<td>.88</td>
<td>.90</td>
<td>.93</td>
<td>.82</td>
<td>.86</td>
<td>.79</td>
<td>.76</td>
<td>.84</td>
</tr>
<tr>
<td>3</td>
<td>.85</td>
<td>.89</td>
<td>.81</td>
<td>.80</td>
<td>.83</td>
<td>.89</td>
<td>.85</td>
<td>.88</td>
<td>.88</td>
<td>.91</td>
<td>.70</td>
<td>.83</td>
</tr>
</tbody>
</table>

| SC  | 1.00 |
| SF  | .68  |
| SM  | .60  |
| OT  | .74  |
| SE  | .70  |
| CT  | .59  |
| LA  | .67  |
| TE  | .69  |
| QS  | .81  |
| CH  | .70  |
| AI  | .71  |
| OE  | .85  |

Factor Correlations

Note. Personal Effectiveness factors are: SC = Self-Confidence, SF = Self-Efficacy, SM = Stress Management, OT = Open Thinking, SE = Social Effectiveness, CT = Cooperative Teamwork, LA = Leadership Ability, TE = Time Efficiency, QS = Quality Seeking, CH = Coping with Change, AI = Active Involvement, OE = Overall Effectiveness. For the 12 factor a priori model, each factor was inferred on the basis of three measured variables (indicated as 1-3 in the upper left column). Each measured variable was allowed to load on only the factor that it was designed to measure and all other factor loadings were constrained to be zero. Non-zero (freely estimated) factor loadings are presented but factor loadings constrained to be zero have been excluded from the table. Non-zero (freely estimated) factor loadings are presented but factor loadings constrained to be zero are excluded. All factor loadings for measured variables are statistically significant.

Factor Invariance Across Age

The results from the five models to test for factorial invariance across Year 7 and Year 10/11 students are presented in Table 6.6. To begin with, the results demonstrate that the fit for the no-invariance model (Model 1) was excellent (TLI = .99; RNI = .99; RMSEA = .05). This model was used as a basis of comparison for the more restrictive models that impose invariance constraints. In Models 2 and 3, the fit indices were the same as those for Model 1, thus providing good support for the invariance of the factor loadings, variances and covariances across age. The imposition of invariance for the factor loadings and uniquenesses (Model 4) produced only a marginally higher RMSEA than the no-invariance model. Finally, the fit indices for the most restrictive model (Model 5) still indicated a good fit and are equal to those for the no-invariance model (TLI = .99, RNI = .99, RMSEA = .05).
Hence, the results for the five models provide clear support for the invariance of factor loadings, uniqueesses, factor variances and covariances across the two age groups for the ROPE.

Table 6.6

Invariance Tests Across Age for the ROPE

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>3889.18</td>
<td>1056</td>
<td>.99</td>
<td>.99</td>
<td>.051</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>3965.43</td>
<td>1080</td>
<td>.99</td>
<td>.99</td>
<td>.051</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>4246.18</td>
<td>1158</td>
<td>.99</td>
<td>.99</td>
<td>.051</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>4223.52</td>
<td>1116</td>
<td>.99</td>
<td>.99</td>
<td>.052</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>4490.59</td>
<td>1194</td>
<td>.99</td>
<td>.99</td>
<td>.051</td>
</tr>
</tbody>
</table>

Note. IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Uniqueesses
Psychometric Properties of the CSI-S

The CSI, originally developed by Amirkhan (1990), measures three fundamental strategies of coping, including problem solving, seeking support and problem avoidance. On the basis of pilot test work, 15 of the original 33 items were selected for use in the current study. The new short form (the CSI-S) was intended to retain the same three scales measured by the original instrument. As the current study was the first large-scale application of this shortened version of this instrument, it was imperative to evaluate its psychometric properties.

Internal Consistency

Internal consistency estimates indicated good internal reliability for the three CSI-S scales (see Table 6.7). For the total participants, the coefficient alphas range from .80 to .89 (median $\alpha = .84$). The Avoidance subscale has the lowest internal consistency estimates ($\alpha = .80$ for total participants), which is consistent with previous research on the 33-item version of the CSI (Amirkhan, 1990). The coefficients for the Year 7 students (median $\alpha = .83$) tend to be lower than those for Year 10/11 students (median $\alpha = .84$). However, the estimates for the Year 7 students were acceptable on each of the three scales. Overall, the results provide good support for the CSI-S responses and indicate that there are only small age differences in the reliability of the three scales.

Table 6.7

Internal Consistency Coefficients for the CSI-S at Time 1 for Year 7 Students, Year 10/11 Students, and the Total Sample, as well as the Number of Items Within Each Coping Scale

<table>
<thead>
<tr>
<th>Coping Scale</th>
<th>Coefficient Alpha</th>
<th>Coefficient Alpha</th>
<th>Coefficient Alpha</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 7 (n = 1191)</td>
<td>Year 10/11 (n = 1038)</td>
<td>Total (n = 2229)</td>
<td></td>
</tr>
<tr>
<td><strong>Subscales:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>.83</td>
<td>.84</td>
<td>.84</td>
<td>5</td>
</tr>
<tr>
<td>Seeks Social Support</td>
<td>.87</td>
<td>.90</td>
<td>.89</td>
<td>4</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.80</td>
<td>.79</td>
<td>.80</td>
<td>6</td>
</tr>
<tr>
<td>Median reliability score</td>
<td>.83</td>
<td>.84</td>
<td>.84</td>
<td></td>
</tr>
<tr>
<td>Mean reliability score</td>
<td>.83</td>
<td>.84</td>
<td>.84</td>
<td></td>
</tr>
</tbody>
</table>
**Factor Structure**

Inspection of the goodness of fit statistics, indicated that the a priori three factor model provided a good fit to the data (chi-square = 1115.64, df = 87; TLI = .95; RNI = .96; RMSEA = .075). The factor loadings for each of the CSI-S items are statistically significant and substantial in size (see Table 6.8). The loadings range from .56 to .88 (median = .74). The Avoidance scale obtained the lowest target loadings of .56 to .76 (median = .67). These results are consistent with the findings reported by Amirkhan (1990) for the long version of the instrument, who also found relatively low factor loadings on the Avoidance scale. The correlations among the factors (see Table 6.8) approximated zero, except for the moderate correlation between Problem Solving and Seeking Social Support (r = .49). This was to be expected as both of these strategies involve active attempts to deal with the problem and are jointly referred to by many contemporary researchers as approach-oriented strategies (e.g., Dumont & Provost, 1999; Herman-Stahl et al., 1995). In summary, the results provided good support for the factor structure of this new short form of the CSI. The goodness of fit indices and factor loadings were acceptable and the factor correlations indicated good discrimination between the scales.

Table 6.8

**Factor Structure for and Correlations among the CSI-S Scales**

<table>
<thead>
<tr>
<th></th>
<th>Problem Solve</th>
<th>Support Seek</th>
<th>Avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor Loadings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.75</td>
<td>.82</td>
<td>.56</td>
</tr>
<tr>
<td>2</td>
<td>.72</td>
<td>.88</td>
<td>.63</td>
</tr>
<tr>
<td>3</td>
<td>.78</td>
<td>.83</td>
<td>.63</td>
</tr>
<tr>
<td>4</td>
<td>.73</td>
<td>.83</td>
<td>.70</td>
</tr>
<tr>
<td>5</td>
<td>.74</td>
<td></td>
<td>.74</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>.76</td>
</tr>
<tr>
<td><strong>Factor Correlations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solve</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support Seek</td>
<td>.49</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>-.04</td>
<td>-.01</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Note.* For the 3 factor a priori model, each factor was inferred on the basis of four to six measured variables (indicated as 1-6 in the upper left column). Each measured variable was allowed to load on only the factor that it was designed to measure and all other factor loadings were constrained to be zero. All factor loadings are statistically significant.
**Factor Invariance Across Age**

The results generated from the five models to test factor invariance for the CSI-S are presented in Table 6.9. The initial baseline model (Model 1) provided a good fit to the data, with a TLI of .96, RNI of .97 and RMSEA of .060. In model 2, the factor loadings were constrained to be equal across the two groups. The fit indices for Model 2 (TLI = .96, RMSEA = .060) are the same as those for the no-invariance model, thus providing good support for the invariance of the factor loadings across age. The further imposition of variances and covariances in Model 3 also produced comparable fit indices (TLI = .96, RMSEA = .062) to the no-invariance model. While the constraint of factor loadings and uniquenesses in Model 4 still provide an acceptable fit (TLI = .95), the fit indices are lower than those for the no-invariance model. These results indicate that support was weakest for the invariance of the uniquenesses, which is consistent with the observation that reliabilities are somewhat higher for the older students. As the fit indices for each of the models indicate a reasonable fit, support was provided for the invariance of the factor structure of the CSI across the two age groups.

Table 6.9

*Invariance Tests Across Age for the CSI-S*

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>854.17</td>
<td>174</td>
<td>.96</td>
<td>.97</td>
<td>.060</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>904.36</td>
<td>186</td>
<td>.96</td>
<td>.97</td>
<td>.060</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>974.50</td>
<td>192</td>
<td>.96</td>
<td>.96</td>
<td>.062</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>1236.05</td>
<td>201</td>
<td>.95</td>
<td>.95</td>
<td>.068</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>1317.68</td>
<td>207</td>
<td>.95</td>
<td>.95</td>
<td>.070</td>
</tr>
</tbody>
</table>

*Note.* IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Uniquenesses.
Psychometric Properties of the APRI-A

The APRI-A was developed in recent years by Parada (2000) to assess two fundamental attitudes to bullying: Pro-bully and pro-victim. To date, no details on the reliability or validity of this instrument have been published. Thus, it was important to test the psychometric properties of the instrument for use in the present research.

Internal Consistency

For the total participants, internal consistency estimates are adequate, ranging from .67 to .72 (see Table 6.10). Coefficient alpha’s tend to be higher for Year 10/11 students (median $\alpha = .74$) than Year 7 students (median $\alpha = .67$). The internal consistency estimates can be considered to acceptable, with the possible exception of the pro-victim scale for Year 7 which had moderate reliability ($\alpha = .64$).

Table 6.10

<table>
<thead>
<tr>
<th>Bullying Attitude Scale</th>
<th>Coefficient Alpha</th>
<th></th>
<th></th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 7 ($n = 1191$)</td>
<td>Year 10/11 ($n = 1038$)</td>
<td>Total ($n = 2229$)</td>
<td></td>
</tr>
<tr>
<td><strong>Subscales:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully</td>
<td>.69</td>
<td>.76</td>
<td>.72</td>
<td>6</td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>.64</td>
<td>.71</td>
<td>.67</td>
<td>6</td>
</tr>
<tr>
<td>Median reliability score</td>
<td>.67</td>
<td>.74</td>
<td>.70</td>
<td></td>
</tr>
<tr>
<td>Mean reliability score</td>
<td>.67</td>
<td>.74</td>
<td>.70</td>
<td></td>
</tr>
</tbody>
</table>

Factor Structure

The CFA yielded a chi-square of 606.01 ($df = 53$), a TLI of .96, RNI of .97 and RMSEA of .069. These goodness of fit indices demonstrate that the a priori 2 factor model provided a reasonable fit to the data. The factor loadings for each of the APRI-A items (see Table 6.11) are statistically significant and generally substantial (median = .68). The last pro-bully item (“Other students look up to people who bully
others”) scored the lowest factor loading of .42. As one would anticipate, the correlation between the two APRI-A factors was negative and moderate in size (-.65). Overall, the results demonstrate that the factor structure for the APRI-A was satisfactory. The goodness of fit indices were acceptable and the factor loadings were significant. There was also acceptable discrimination between the pro-bully and pro-victim scales.

Table 6.11

<table>
<thead>
<tr>
<th></th>
<th>Pro-Bully</th>
<th>Pro-Victim</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor Loadings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.77</td>
<td>.47</td>
</tr>
<tr>
<td>2</td>
<td>.70</td>
<td>.68</td>
</tr>
<tr>
<td>3</td>
<td>.46</td>
<td>.77</td>
</tr>
<tr>
<td>4</td>
<td>.77</td>
<td>.69</td>
</tr>
<tr>
<td>5</td>
<td>.68</td>
<td>.62</td>
</tr>
<tr>
<td>6</td>
<td>.42</td>
<td>.53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Pro-Bully</th>
<th>Pro-Victim</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor Correlations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>-0.65</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note.* For the 2 factor a priori model, each factor was inferred on the basis of six measured variables (indicated as 1-6 in the upper left column). Each measured variable was allowed to load on only the factor that it was designed to measure and all other factor loadings were constrained to be zero. Non-zero (freely estimated) factor loadings are presented but factor loadings constrained to be zero are excluded. All factor loadings for measured variables are statistically significant.

**Factor Invariance Across Age**

Table 6.12 presents the results from the five models to test for factor invariance across Year 7 and Year 10/11 students. The first model consisted of no constraints, such that the parameter estimates were free to vary across the two age groups. The results for this no-invariance model provided a good fit to the data (TLI = .96, RNI = .94, RMSEA = .048). For Models 2 and 3, the RMSEA’s were marginally better than those for the no-invariance model. These findings are consistent with Marsh’s (1994a) observation that certain indices, such as the RMSEA, include a penalty for model complexity so that, in some instances, the introduction of invariance constraints results in improvement in these indices. While the constraint of factor loadings and uniquenesses in Model 4 still provided an
acceptable fit ($TLI = .93$), the fit indices were lower than those for the no-invariance model. These results indicate that support was weakest for the invariance of the unique values, which is consistent with the observation that reliabilities are somewhat higher for the older students. Finally, the indices for the most restrictive model (Model 5) indicate an acceptable fit ($TLI = .95$) and do not differ substantially from those for the no-invariance model. In summary, the results provide clear support for the invariance of the factor loadings, factor variances and covariances, but perhaps not the unique values. The lack of invariance for the unique values is consistent with previous evidence regarding the internal consistency of the instrument, with higher reliabilities being found for the older students.

Table 6.12

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>368.61</td>
<td>106</td>
<td>.96</td>
<td>.99</td>
<td>.048</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>379.57</td>
<td>116</td>
<td>.96</td>
<td>.99</td>
<td>.046</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>390.40</td>
<td>119</td>
<td>.96</td>
<td>.98</td>
<td>.046</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>652.76</td>
<td>128</td>
<td>.93</td>
<td>.97</td>
<td>.060</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>668.87</td>
<td>131</td>
<td>.95</td>
<td>.95</td>
<td>.061</td>
</tr>
</tbody>
</table>

*Note.* IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Unique values.
Psychometric Properties of the Support Scales

The Support Scales developed by Richards and Parada (2000) were used in the present study to assess perceived support from parents and peers. To date, no details on the reliability or validity of these scales have been published. Thus, it was imperative to test the psychometric properties of the instrument for use in the present research.

Internal Consistency

The internal consistency estimates for the Support Scales are presented in Table 6.13. The coefficients for the two scales were good to excellent (median $\alpha = .90$ for total participants). The results for the Year 7 (median $\alpha = .89$) students were very similar to those for Year 10/11 students (median $\alpha = .90$), demonstrating that reliability varied very little as a function of age.

Table 6.13

<table>
<thead>
<tr>
<th>Support Scale</th>
<th>Coefficient Alpha</th>
<th>Year 7 (n = 1191)</th>
<th>Year 10/11 (n = 1038)</th>
<th>Total (n = 2229)</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subscales:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent Support</td>
<td>.88</td>
<td>.89</td>
<td>.89</td>
<td>.89</td>
<td>4</td>
</tr>
<tr>
<td>Peer Support</td>
<td>.89</td>
<td>.90</td>
<td>.90</td>
<td>.90</td>
<td>4</td>
</tr>
<tr>
<td>Median reliability</td>
<td>.89</td>
<td>.90</td>
<td>.90</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td><strong>Mean reliability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Factor Analysis

Inspection of the goodness of fit indices, indicated that the a priori 2 factor model provided a good fit to the model (chi-square = 268.57, $df = 19$; TLI = .98; RNI = .99; RMSEA = .077). The factor loading for each of the support items were statistically significant and considerable in size (see Table 6.14). The loadings ranged from .84 to .90 (median = .90). The correlation between Parent Support and Peer Support was .44. In summary, the results provide good support for the factor
structure of the Support Scales. The fit indices and the factor loadings were good and there was satisfactory discrimination between the two scales.

Table 6.14

<table>
<thead>
<tr>
<th>Factor Structure for and Correlations Among the Support Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Factor Loadings</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>Factor Correlations</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Note.* For the 2 factor a priori model, each factor was inferred on the basis of four measured variables (indicated as 1-4 in the upper left column). Each measured variable was allowed to load on only the factor that it was designed to measure and all other factor loadings were constrained to be zero. Non-zero (freely estimated) factor loadings are presented but factor loadings constrained to be zero are excluded. All factor loadings for measured variables are statistically significant.

**Factor Invariance Across Age**

The first model to test for factor invariance across age (Model 1) produced a good fit to the data (TLI = .98, RNI = .99, RMSEA = .061). The fit indices for Model 2 were equal to those for the no-invariance model (TLI = .98), thus providing good support for the invariance of the factor loadings. The further imposition of invariance of the variances and covariances still provided an acceptable fit (TLI = .97), but one that was lower than the no-invariance comparison model. For Model 4, the incremental fit indices provided evidence for an acceptable fit (TLI = .96; RNI = .97) though RMSEA = .09), but the RMSEA was marginally higher than the .08 value taken to indicate adequate fit. Finally, the indices for the most restrictive model (model 5) produced poorer fit indices (TLI = .95, RMSEA = .10) than those from Model 4. Overall, the results indicate that support was strongest for the invariance of the factor loadings. Support was weakest for the invariance of the uniquenesses, which is consistent with the observation that reliabilities are somewhat higher for the older students.
Table 6.15

*Invariance Tests Across Age for the Support Scales*

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>197.10</td>
<td>38</td>
<td>.98</td>
<td>.99</td>
<td>.06</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>229.53</td>
<td>44</td>
<td>.98</td>
<td>.99</td>
<td>.06</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>371.404</td>
<td>47</td>
<td>.97</td>
<td>.98</td>
<td>.08</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>544.84</td>
<td>52</td>
<td>.96</td>
<td>.97</td>
<td>.09</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>717.15</td>
<td>55</td>
<td>.95</td>
<td>.95</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note.* IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Uniquenesses.
Psychometric Properties of the Enjoyment of School Scale

This scale was developed for the present study to assess students’ perceived enjoyment of school. On the basis of pilot test work, five items were selected for the Enjoyment of School Scale. As this is a new scale developed for the current research, it was crucial to present details on its psychometric properties.

Internal Consistency

Internal consistency estimates for the Enjoyment of School Scale were excellent. For the total participants, coefficient alpha was .94. The coefficient for the Year 7 students ($\alpha = .93$) was equivalent to that for Year 10/11 students ($\alpha = .93$), which indicated that the internal consistency did not vary as a function of age.

Factor Analysis

The one-factor congeneric CFA model yielded a chi-square of 104.24 ($df = 5$), a TLI of .99, RNI = .99 and RMSEA = .09. Although the RMSEA value is slightly higher than the .08 value typically taken to indicate adequate fit, the TLI and RNI are exceptionally high. It is important to note that previous research has suggested that the RMSEA may be biased against instruments with few items. The recent study of Kenny and McCoach (2003) found that RMSEA values decline as the number of variables in the model increases. Thus, in view of the strong TLI and RNI, as well as the small number of variables included in this instrument, it would clearly be inappropriate to reject the model based on the RMSEA. Furthermore, the factor loadings for the scale were very good, ranging from .85 to .89 (median = .89). Thus, the results indicate that the items included in this scale measure a unidimensional construct.

Factor Invariance Across Age

The results from the five models to test for factorial invariance across the two age groups for the Enjoyment of School Scale are presented in Table 6.16. Overall, the results in this table demonstrate that the introduction of invariance constraints produces only small changes in the TLI, RNI and RMSEA across the five models. The fit for the no invariance model (Model 1) was acceptable (TLI = .99;
RNI = .99). The introduction of invariance constraints in Models 2 to 4 produced marginally better RMSEA values than those for the no-invariance model. Furthermore, the results for Model 5, where all parameter estimates were constrained, also provided a better RMSEA than those for models that allowed some or all of the parameter estimates to be freely estimated. This finding is consistent with Marsh and Balla’s (1992) observation that the penalty for model complexity in the parsimony indices may in some instances be too extreme. In summary, these results provide good support for the invariance of the factor structure for Year 7 and Year10/11 students.

Table 6.16

<table>
<thead>
<tr>
<th>Model</th>
<th>CHISQ</th>
<th>DF</th>
<th>TLI</th>
<th>RNI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 NO IN</td>
<td>94.86</td>
<td>10</td>
<td>.99</td>
<td>.99</td>
<td>.090</td>
</tr>
<tr>
<td>2 LOAD=IN</td>
<td>123.87</td>
<td>14</td>
<td>.99</td>
<td>.99</td>
<td>.087</td>
</tr>
<tr>
<td>3 LOAD=IN, VAR/COV=IN</td>
<td>124.62</td>
<td>15</td>
<td>.99</td>
<td>.99</td>
<td>.084</td>
</tr>
<tr>
<td>4 LOAD=IN, UN=IN</td>
<td>144.44</td>
<td>19</td>
<td>.99</td>
<td>.99</td>
<td>.077</td>
</tr>
<tr>
<td>5 LOAD=IN, UN=IN, VAR/COV=IN</td>
<td>145.30</td>
<td>20</td>
<td>.99</td>
<td>.99</td>
<td>.075</td>
</tr>
</tbody>
</table>

*Note. IN = invariant; LOAD = Factor loadings; VAR/COV = Variances and covariances; UN = Uniquenesses.*
Summary of Reliability and CFA Results

The primary purpose of this study was to examine the psychometric properties of instruments used to measure self-concept, life effectiveness, coping strategies, perceptions of bullying, social support and enjoyment of school. The results from analyses conducted thus far provide good support for the reliability and validity of each of the instruments tested.

For each of the measures, the internal consistency estimates were good, with the possible exception of the pro-victim scale, which had a moderate reliability. Consequently, these results demonstrate that the subscales are reliable measures for secondary school students and provide support for Hypothesis 1.1.

Clear evidence was also found for the factor structure of the instruments. Consistent with Hypothesis 1.2, the CFA results for each instrument identified the a priori factors that they were designed to measure. The goodness of fit indices for each model were reasonable and the factor loadings were consistently high. Furthermore, the factor correlations showed satisfactory discrimination between the scales.

Finally, the results demonstrated that the factor structure for the instruments were very similar for younger (Year 7) and older (Year 10/11 students). The CFA results for each instrument separately provided clear support for the invariance of the factor loadings across the two groups, which is the most critical result required to infer factor invariance (Marsh et al., 1998). The most deficient source of invariance was for the uniquenesses on the APRI-A and Support Scales, which is reflective of somewhat more reliable responses by the older students on these instruments. Nevertheless, as the fit indices for even the most restrictive models provided an adequate fit to the data for all instruments apart from the Support Scales, support was found for Hypothesis 1.3.
Multifactorial Analysis Including all Instruments

Factor Structure

A final CFA was conducted which included all scales from each instrument in the model (a total of 31 scales). This CFA yielded a chi-square of 34,746.56 ($df = 7,409$), a TLI of .98, RNI of .98, and RMSEA of .043. These goodness of fit indices demonstrate that the a-priori 31 factor model provided an excellent fit to the data. The factor loadings for each of the 127 items were statistically significant and consistently high (range .47 to .95, Median = .72). Furthermore, the factor loadings produced for the 31 factor model were nearly identical to those found in the separate analyses of each instrument. For this reason, the results have not been presented separately in this chapter, but they can be found in Appendix 6A. The CFA based on all scales included in the study clearly identified all 31 factors that they were designed to measure, thereby providing further support for Hypothesis 1.2. Considering the large number of the scales that were included in this model, and which are closely related by nature, the results from this analysis are exceptional.

Factor Correlations

The correlations among the 31 factors are presented in Table 6.16. Correlations among the 31 factors ranged from -.65 to .89, but the median correlation was quite modest (Median $r = .36$). Although some of the correlations were moderate to strong, none of the correlations approached 1.0. Notably, the correlations among factors from the same instrument are almost exactly the same in the combined factor analysis as in the separate factor analyses conducted on each instrument considered separately. As shown in Table 6.16, almost all negative correlations were related to problem avoidance and the pro-bully scale. This was to be expected as, in contrast to all other outcome measures, lower scores on these two scales are considered to be more desirable than higher scores on these scales. Even when these negatively oriented scales were "reflected" (i.e., reverse scored), the median correlation among the 31 factors was still only .37.

The highest correlation found among the 31 factors was between parent self-concept and parent support ($r = .89$). Substantially it makes sense that students who
receive strong parental support would report elevated parental relations. As one would anticipate, the global self-esteem scale from the SDQ was highly related to the 12 ROPE life effectiveness factors, and in particular with self-confidence \((r = .85)\) and overall effectiveness \((r = .81)\). It is not surprising that such high correlations were found between these scales as they are so closely related by nature. The results also showed that active involvement was strongly related to physical ability \((r = .76)\). Thus, this finding suggests that students who have high interest and ability in physical activities are also more likely to use action and energy to make things happen in their lives. Another relatively high correlation was found between the peer support scale and same-sex relations \((r = .60)\), which is reflective of Printz et al.’s (1999) contention that soliciting support from peers requires social competencies.

In summary, although some of the correlations among the 31 factors were moderate to strong, this was to be expected due to the overlapping nature of the instruments being used. Furthermore, each of the strong correlations evidenced were logical and consistent with theoretical expectations. As none of the correlations approached 1.0 and the median correlation was quite modest, the factor correlations show satisfactory discrimination between the 31 factors.

**Factor Invariance Across Age**

Final tests of factor invariance were also conducted on the 31 factor model. Results from the five models used to test for factor invariance are presented in Appendix 6.2. The results demonstrate that the fit indices are very comparable across the models. For the least restrictive model (Model 1), the fit indices were excellent, with a TLI of .98, RNI of .98 and RMSEA of .034. For the final model, where factor loadings, variances, covariances and uniquenesses are constrained, the fit indices were also excellent \((\text{TLI} = .98, \text{RNI} = .98, \text{RMSEA} = .035)\) and very similar to those found for the no-invariance model. Therefore, these results provide good support for the invariance of the factor structure across the two age groups and provide additional support for Hypothesis 1.3.

Summary

Current research on psychological and educational interventions continues to be criticized for utilising anecdotal evaluations and instrumentation with unsubstantiated psychometric properties. However, the results of Study 1 provide an impressive endorsement of the measures employed for the present research to examine the outcomes of a peer support program. Systematically rigorous testing procedures were applied which clearly demonstrated strong psychometric properties for each of the instruments in terms of reliability and factor structure. Importantly, this study resolves the difficulty of identifying theoretically and psychometrically sound instruments to assess changes in self-perceptions of students in such programs. The results also provide important information about the relations between a wide-range of psychological constructs that has not been offered by previous research. The results presented in this chapter, and their implications for research and practice, will be explored in Chapter 10.
CHAPTER 7

STUDY 2 RESULTS: EFFECTS OF THE INTERVENTION ON YEAR 7 STUDENTS

Introduction

Over recent years, researchers and practitioners have advocated the potential of peer support programs in alleviating many of the problems faced by youngsters during adolescence and the transition to secondary school. However, few studies have formally evaluated peer support programs and these studies tend to be of questionable quality. Study 2 was specifically designed to address this issue and advance current research by evaluating a widely-used peer support program in Australian secondary schools.

Based on the major objectives of the program outlined by the Peer Support Foundation, it was anticipated that Year 7 students would display increases in the following domains: school self-concept, school citizenship, general sense of self, connectedness, resourcefulness, and sense of possibility for the future (See Chapters 3 and 4). The primary aim of this study was to identify the effects of the intervention on these areas for Year 7 students. The results presented are based on the methodology employed in Study 2 where experimental and control groups completed questionnaires on three separate occasions. Data were collected before the commencement of the program (T1), at the completion of the program (T2) and again, four months later (T3). Participants consisted of 930 Year 7 students from three secondary schools (See Chapter 5 for further details on the methodology for Study 2).

In this chapter, multilevel modelling procedures (see Chapter 5) were used to compare the effects for experimental group results with those of the control group. This approach was selected because it provides a much richer and more appropriate way of testing longitudinal data than would be possible with single-level approaches that ignore the hierarchical data structure. The findings demonstrate the effects of the program on T2 and T3 outcomes, while controlling for the parallel measures of T1 outcomes. Tests for aptitude-treatment interaction effects are also discussed. Furthermore, the use of multilevel modelling opened up the opportunity to examine
how the effects varied between individual students, peer support groups and different schools.

**Overview of Statistical Analyses**

Multilevel modelling has emerged over the past decade as an attractive approach to the analysis of hierarchically structured data (Goldstein, 1995; Kref & De Leeuw, 1998; Snijders & Bosker, 1999). Longitudinal studies possess a hierarchical data structure in which repeated measurements are a separate level nested within an individual. Multilevel modelling is advantageous over standard ANOVA and other statistical methods because it overcomes problems associated with aggregation bias and lack of independence between measurements at different levels (see Chapter 5 for an overview). In addition, this approach allows for unequal group sizes as well as missing data, which are persistent problem in longitudinal research. The main advantage of this approach, however, is that it provides the ability to model processes within students (over time), between students, and between higher levels simultaneously, with maximum statistical precision at each level.

For the present study, the peer support program was hypothesised to have a positive and sustained impact on outcomes measuring school self-concepts, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility for the future. Analyses consisted of a three-level model, with time at the first level, individual student at the second level, and school at the third level. The data was arranged so that the two post-intervention test occasions (T2 and T3) were specified at the first level and T1 measures were treated as covariates in models examining the effects of the program (see Marsh, Hau, & Kong, 2002, for a rationale for the use of this conditional multilevel covariance approach). Using this approach, the effects for experimental group results were compared with those of the control group for each outcome measure. The estimates for the Group x Time interaction were examined in order to determine the stability of outcomes between T2 and T3.

Study 2 was also designed to test for the presence of aptitude-treatment interaction effects. The aim was to assess whether students with lower pre-intervention scores benefited more from the intervention than students who scored at or above the normal range (see Chapter 4). Further analyses were also conducted to
determine whether the effects of the program varied from one peer support group to another. For further details on the statistical techniques applied in this chapter, see Chapter 5.

The research hypotheses in Chapter 4 have been used as an organising device for the present chapter, with the results being presented in the same order as the hypotheses. For the first hypothesis of this study (i.e., general school self-concept), a detailed description of the statistical analyses and methods of interpretation have been presented. The methods described for this first hypothesis were employed for the remainder of the hypotheses and outcomes examined in this chapter.

**Preliminary Analyses**

Raw group means and standard deviations for the experimental and control groups at the three data collection points are presented in Appendix F-1. The experimental and control groups were initially examined for pre-existing differences in T1 scores. Analyses were conducted using multilevel modelling procedures, with Group (i.e., experimental versus control) added to each of the baseline components model as an independent variable with a separate analysis being conducted for each T1 outcome measure. A two level model was specified with individual student at the first level and school at the second level. The results from these analyses demonstrate that significant main effects were found on 5 out of 31 of the outcome measures (see Table 7.1). A significant positive effect was found for physical appearance, parent relations, cooperative teamwork and time efficacy. For each of these scales, participants in the experimental group scored higher in these domains than those in the control group. A significant effect in the negative direction was detected on the problem avoidance scale (see Table 7.1), which illustrates that participants in the experimental group scored significantly lower on problem avoidance than the control group. In contrast to most other outcome measures, lower scores on the problem avoidance scale are considered to be more desirable than higher scores on these scales. Consequently, the results show that experimental group students exhibited superior scores than the control groups on each of the five scales where significant differences were found. Overall, pre-test differences between the experimental and control groups were consistently small and—despite the large sample sizes—were statistically significant for only five of the 31 outcomes considered. However, it is
important to emphasise that even these small differences at pre-test are controlled in subsequent analyses, using T1 pre-test measures as a covariate in the analyses of T2 post-test and T3 follow-up measures.

Table 7.1

*Model Testing for Differences in T1 Scores*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Est.</th>
<th>Scale</th>
<th>Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDQII-S</strong></td>
<td></td>
<td><strong>ROPE</strong></td>
<td></td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>-.051 (.034)</td>
<td>Self-Confidence</td>
<td>.044 (.034)</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>.098 (.034)</td>
<td>Self-Efficacy</td>
<td>.022 (.034)</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>.029 (.034)</td>
<td>Stress Management</td>
<td>.001 (.034)</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>-.012 (.034)</td>
<td>Open Thinking</td>
<td>.002 (.034)</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>-.010 (.034)</td>
<td>Social Efficacy</td>
<td>.040 (.034)</td>
</tr>
<tr>
<td>Parent Relations</td>
<td>.068 (.034)</td>
<td>Cooperative Teamwork</td>
<td>.071 (.034)</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>-.018 (.034)</td>
<td>Leadership Ability</td>
<td>-.013 (.034)</td>
</tr>
<tr>
<td>Verbal</td>
<td>.001 (.034)</td>
<td>Time Efficacy</td>
<td>.071 (.034)</td>
</tr>
<tr>
<td>Math</td>
<td>.005 (.034)</td>
<td>Quality Seeking</td>
<td>.061 (.034)</td>
</tr>
<tr>
<td>General School</td>
<td>-.006 (.034)</td>
<td>Coping with Change</td>
<td>-.020 (.034)</td>
</tr>
<tr>
<td>Global Esteem</td>
<td>.066 (.034)</td>
<td>Active Involvement</td>
<td>.013 (.034)</td>
</tr>
<tr>
<td><strong>CSI</strong></td>
<td></td>
<td>Overall Effectiveness</td>
<td>.061 (.034)</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>.017 (.034)</td>
<td><strong>APRI-A</strong></td>
<td></td>
</tr>
<tr>
<td>Seeks Social Support</td>
<td>-.012 (.034)</td>
<td>Pro-Bully</td>
<td>-.045 (.035)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>-.095 (.034)</td>
<td>Pro-Target</td>
<td>.006 (.035)</td>
</tr>
<tr>
<td><strong>Support Scales</strong></td>
<td></td>
<td><strong>Enjoyment of School Scale</strong></td>
<td>.064 (.044)</td>
</tr>
<tr>
<td>Parent Support</td>
<td>.056 (.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Support</td>
<td>.007 (.034)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Est. = Parameter estimate (Positive values indicate higher values for the experimental group). Standard errors are given in parentheses. All T1 variables were standardised to have a mean = 0 and SD = 1. Values in bold are statistically significant.
School Self-Concept

**Hypothesis 2.1: Effects on General School Self-Concept**

For Study 2, it was hypothesised that participants in the peer support program would report higher general school self-concepts than students in the control groups and that these gains would be stable over time. As this is the first outcome for which the results are being reviewed, a detailed description of the statistical analyses and methods of interpretation have been presented. The methods described for general school self-concept have been employed for the remainder of the outcomes examined in this chapter.

Three key models were used to compare the general school self-concepts of students in the experimental group with those of the control group. Model 1 was a baseline variance components model that was used to determine how much of the total variance was partitioned into variance components associated with school, individual and time. To illustrate the way in which inferences were made from the baseline models, the MLwiN output produced for general school self-concept has been presented in Figure 7.1.

\[
g_{\text{school}}_{ij} \sim N(XB, \Omega) \\
g_{\text{school}}_{ij} = \beta_{0ij} + \epsilon_{0ij}
\]

\[
\beta_{0ij} = -0.040(0.155) + v_{0i} + u_{0ij} + e_{0ij}
\]

\[
\begin{bmatrix} v_{0i} \\ u_{0ij} \\ e_{0ij} \end{bmatrix} \sim N(0, \Omega) \\
\Omega_v = \begin{bmatrix} 0.067(0.058) \end{bmatrix} \\
\Omega_u = \begin{bmatrix} 0.818(0.045) \end{bmatrix} \\
\Omega_e = \begin{bmatrix} 0.297(0.016) \end{bmatrix}
\]

*Figure 7.1. Model 1: Baseline variance components model for general school self-concept (gnschool). In the model, gnschool_{ij} is the outcome measure for individual j of the kth school at time i. XB = fixed part of the model; \Omega = covariance matrix; \beta_{0ijk} = intercept; v_{0ik} = random school effect; u_{0ik} = random student effect; and e_{0ik} = random time effect.*
Figure 7.1 shows that in this model general school self-concept (gnschool) is the outcome measure. Subscript $i$ refers to the test occasion (level 1), $j$ to the individual student (level 2) and $k$ to the school (level 3). Subscript $ijk$ means that variables vary from test occasion to test occasion (T2 to T3), from individual to individual, and from school to school. The residuals, $v_{ijk}$, represent the random school effect, $u_{ijk}$, the random student effect and $e_{ijk}$, the random time effect. These residuals are assumed to be normally distributed with a mean of zero and a variance of $\sigma^2_{v0}$, $\sigma^2_{u0}$ and $\sigma^2_{e0}$, respectively.

The parameter estimates shown in Figure 7.1 have been computed for the fixed and random parts of the model. The standard errors of the parameters are presented in parentheses. The mean intercept, $\beta_0$, constituting the fixed part of the model, is -.040 with a standard error of .153. The intercepts for the different schools (level 3 residuals, $v_{0ijk}$) have a variance, $\sigma^2_{v0}$, of .067 (standard error = .058) indicating that the intercepts of the three different schools do not differ considerably from one another. The level 2 residuals, $\sigma^2_{u0}$, have a variance of .818 with a standard error of .048. This parameter estimate is large, demonstrating that most of the variation in general school self-concept could be explained by differences at the individual student level. The level 1 residuals, $e_{ijk}$, indicate a considerable portion of the variation in general school self-concept could also be explained by differences at the test occasion level ($\sigma^2_{e0} = .297$; standard error = .016). Variation at the test occasion level does not connote systematic variation (i.e., T3 systematically higher or lower than T2); rather it signifies lack of complete T2-T3 stability. Using the Wald statistic, the variance at the individual student and test occasion level are significant because the ratio of the parameter estimate to its standard error is clearly greater than 1.96.

The variance components shown in Figure 7.1 were also used to compute the interclass correlation. The total variance in general school self-concept is the sum of the level 3, level 2 and level 1 variances (.067 + .818 + .297 = 1.182). The between-student variance makes up a proportion of .692 of this total variance (.818 ÷ 1.182). This is known as the intra-student correlation, which can be taken to mean that 69.2 percent of the total variance was at the individual level. Similarly, the intra-time correlation can be calculated by dividing the level 1 variance by the total variance.

135
(.297 + 1.182 = .251). Hence, 25.1% of the total variance was at the test occasion level.

Model 1b added T1 general school self-concept scores to the baseline model, which was used to indicate how much of the variance in school and individual student scores could be explained in terms of the T1 variable. The results presented in Figure 7.2 demonstrate that the variance for individual student was reduced substantially by controlling for the T1 general school self-concept (.818 to .444). Hence, the majority of between-individual variation could be explained in terms of pre-existing differences that were measured prior to the start of the program. The introduction of T1 scores into the model also led to small decreases in the variances for school (.067 to .045). This shows that the differences among schools were reduced somewhat after controlling for the effect of T1 general self-concept. In contrast, the inclusion of the pre-test score did not have any effect on the size of the variance for test occasion (.297 to .296). Logically, it could not because the same T1 measure was a covariate for both T2 and T3 (i.e., for a given student, T1 scores were constant).

\[
gschoole\_jk \sim N(XB, \Omega)
\]
\[
gschoole\_jk = \beta_{0jk} + 0.602(0.025)t1\_gschoole\_jk
\]
\[
\beta_{0jk} = -0.039(0.126) + \nu_{0k} + u_{0jk} + \epsilon_{0jk}
\]
\[
\begin{bmatrix}
\nu_{0k}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.045(0.039) \end{bmatrix}
\]
\[
\begin{bmatrix}
u_{0jk} \\
u_{ujk} \\
u_{ejk}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.444(0.032) \\
0.296(0.017)
\end{bmatrix}
\]

*Figure 7.2.* Model 1b: Effect of T1 general school self-concept on post-intervention general school self-concept outcomes. In the model, gschoole\_jk is the outcome measure for individual j of the kth school at time i. XB = fixed part of the model; \( \Omega \) = covariance matrix; \( \beta_{0jk} \) = intercept; t1\_gschoole = T1 general school self-concept; \( \nu_{0k} \) = random school effect; \( u_{0jk} \) = random student effect; and \( \epsilon_{0jk} \) = random time effect.

In Model 2, three additional variables were added to the model. These included Time, Group, and the Group x Time interaction (see Figure 7.3). The results
for Time indicate that, across groups, general self-concept scores declined between T2 and T3 (.029 ÷ .015 > 1.96). Of chief importance, however, to the present study are the effects for Group and the Group by Time interaction. The parameter estimate (and standard error) for Group demonstrates that the difference between the experimental and control groups was significant, averaged across T2 and T3 (.059 ÷ .028 > 1.96). The slope was positive which suggests that participants in the experimental group reported higher general school self-concept scores than participants in the control group, after the effects of T1 scores had been controlled.

\[
gnschool_{jk} \sim N(X_{jk}, \Omega)
\]

\[
gnschool_{jk} = \beta_0 + \beta_1 \text{group}_k + \beta_2 \text{time}_k + \beta_3 \text{group}_k \times \text{time}_k + e_{jk}
\]

\[
\begin{bmatrix}
    \nu_{jk} \\
    u_{jk} \\
    e_{jk}
\end{bmatrix} \sim N(0, \Omega)
\]

\[
\begin{bmatrix}
    \nu_{jk} \\
    u_{jk} \\
    e_{jk}
\end{bmatrix} \sim N(0, \Omega) =
\begin{bmatrix}
    0.044(0.038) \\
    0.440(0.032) \\
    0.295(0.016)
\end{bmatrix}
\]

**Figure 7.3.** Model 2: Effect of T1 general school self-concept, time, group, and group x time on post-intervention self-concept scores. In the model, gnschool\(_{jk}\) is the outcome measure for individual \(j\) of the \(k\)th school at time \(i\). \(X_{jk}\) = fixed part of the model; \(\Omega\) = covariance matrix; \(\beta_{0jk}\) = intercept; t1gnschool = T1 general school self-concept; time = T2 and T3; group = experimental versus control; \(\nu_{0jk}\) = random school effect; \(u_{0jk}\) = random student effect; and \(e_{ijk}\) = random time effect.

The parameter estimate (and standard error) for Group by Time indicates that the interaction was not significant (.012 ÷ .015 < 1.96, see Figure 7.3). This suggests the positive effects of the intervention on general school self-concept were maintained over time. Even though the interaction was not statistically significant, for purposes of illustration, a graph of the interaction is presented in Figure 7.4 to verify this interpretation. Following the advice of Hox (1995; also see Harwell, 1998), standardised values, rather than raw scores, were imputed into the regression equation from the multilevel analyses and plotted on the graph in order to accurately represent the effects (see Figure 7.4). This graph shows that the experimental group
reported higher general school self-concept scores than the control group at T2. Between T2 and T3, participants in both the experimental and control group reported slight decreases in general school self-concept. The lines for the experimental and control group are approximately parallel, which is the reason why the interaction effect was not significant. Thus, the positive effects of the intervention on general school self-concept were maintained over the T2 T3 follow-up period.

![Graph showing change in general school self-concept (Gnschool) for experimental and control groups over T2 to T3. Post-intervention Gnschool scores were standardised in terms of the mean and SD of T1 scores.](image)

*Figure 7.4. Change in general school self-concept (Gnschool) for the experimental and control groups over T2 to T3. Post-intervention Gnschool scores were standardised in terms of the mean and SD of T1 scores.*

Model 3 included the addition of three new interaction terms, including T1gnschool x Time, T1gnschool x Group, and T1gnschool x Group x Time. This model was designed to test for the presence of aptitude-treatment interaction effects. Figure 7.5 shows that the parameter estimate for the T1gnschool x Group interaction was marginally significant (-0.055/.028>1.96). A graph of the interaction is presented in Figure 7.6 to clarify the nature of this interaction. The graph illustrates that for students with lower T1 general school self-concept scores, the scores for the experimental group were higher than those of the control group. This suggests that students with lower prior levels of general school self-concept benefited more from participating in the program.
The results for the T1gnschool x Group x Time interaction was not significant, indicating that the effects of the aptitude-treatment interaction (i.e., T1gnschool x Group) were maintained over time. This shows that the positive effects for students with initially lower levels of self-concept were evident at T3 as well as T2.

\[
gnschool_{jk} \sim N(XB, \Omega)
\]
\[
gnschool_{jk} = \beta_{0jk}\text{cons} + 0.601(0.028)T1gnschool_{jk} + -0.029(0.015)time_{jk} + 0.061(0.028)\text{group}_{jk} + \\
-0.012(0.015)\text{group} . time_{jk} + 0.016(0.015)T1gnschool . time_{jk} + \\
-0.055(0.028)T1gnschool . \text{group}_{jk} + -0.016(0.016)T1gnschool . \text{group} . time_{jk}
\]
\[
\beta_{0jk} = -0.040(0.123) + v_{0k} + u_{0jk} + e_{0jk}
\]
\[
\begin{bmatrix} 
  v_{0k} 
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 
  0.043(0.037) 
\end{bmatrix}
\]
\[
\begin{bmatrix} 
  u_{0jk} 
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 
  0.437(0.032) 
\end{bmatrix}
\]
\[
\begin{bmatrix} 
  e_{0jk} 
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 
  0.294(0.016) 
\end{bmatrix}
\]

\[-2 \log(\text{likelihood(IGLS Deviance)}) = 3382.778(1448 \text{ of } 1860 \text{ cases in use})\]

**Figure 7.5.** Model 3: Aptitude-treatment interaction model for school self-concept. In the model, gnschool_{jk} is the outcome measure for individual j of the kth school at time i. XB = fixed part of the model; \( \Omega \) = covariance matrix; \( \beta_{0jk} \) = intercept; T1gnschool = T1 general school self-concept; time = T2 and T3; group = experimental versus control; \( v_{0k} \) = random school effect; \( u_{0jk} \) = random student effect; and \( e_{0jk} \) = random time effect.
Figure 7.6. Relationship between post-intervention general school self-concept scores (Gnschool) and corresponding T1 scores (T1Gnschool) for the experimental and control groups. Post-intervention Gnschool scores were standardised in terms of the mean and SD of T1 scores.

Hypothesis 2.2: Effects on Verbal Self-Concept

It was hypothesised that participants in the peer support program would report higher verbal self-concept scores than students in the control groups and that these gains would be stable over time. A series of models similar to the models utilised to test the previous hypothesis were used to test the effects of the peer support program on the verbal self-concept scores of students in the experimental group compared with those in the control group. A summary of the results from these models is presented in Table 7.2. More comprehensive results for verbal self-concept can be found in Appendix F-2.

The findings for the baseline components model (Model 1) indicate that there was significant variance at the individual student ($\sigma^2_v = .710$, $SE = .041$) and test occasion level ($\sigma^2_e = .224$, $SE = .013$). However, the results show that there was little variation between schools ($\sigma^2_v = .080$, $SE = .068$). Calculation of the intra-class correlations indicate that 68.7% of the variance was at the individual student level, 23.6% was at the test occasion level and 7.7% was at the school level.
As with general school self-concept, as well as for the remainder of the outcomes discussed in this chapter, the results for Model 1b demonstrated that the majority of between-individual variation could be explained in terms of pre-existing differences measured before the commencement of the program. While the results for Model 1b have not been presented within each of the summary tables for the following outcomes, they can be found in Appendix F-2.

Table 7.2

Multilevel Models for Year 7 Students on the Verbal Self-Concept Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.085</td>
<td>.069</td>
<td>.068</td>
</tr>
<tr>
<td>T1 Verbal</td>
<td></td>
<td>.584 (.027)</td>
<td>.581 (.027)</td>
</tr>
<tr>
<td>Time</td>
<td>.012 (.013)</td>
<td>.013 (.013)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.079 (.026)</td>
<td>.080 (.026)</td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>-.006 (.013)</td>
<td>-.006 (.013)</td>
<td></td>
</tr>
<tr>
<td>T1 Verbal X Time</td>
<td></td>
<td>-.018 (.014)</td>
<td></td>
</tr>
<tr>
<td>T1 Verbal X Group</td>
<td>-.033 (.026)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 Verbal X Group X Time</td>
<td>-.003 (.014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\text{r}}$: between school variance</td>
<td>.080 (.068)</td>
<td>.025 (.022)</td>
<td>.024 (.021)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{u}}$: between student variance</td>
<td>.710 (.041)</td>
<td>.395 (.027)</td>
<td>.395 (.027)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{e}}$: between test occasion variance</td>
<td>.244 (.013)</td>
<td>.234 (.013)</td>
<td>.233 (.013)</td>
</tr>
</tbody>
</table>

Note. T1 Verbal = T1 verbal self-concept; Time = test occasion (T2 and T3); Group = test condition (experimental and control; positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

In Model 2 (see Table 7.2), a significant main effect was found for Group (Est. = .079, SE = .026). The positive direction of the parameter estimate illustrates that participants in the experimental group reported higher verbal self-concept scores than participants in the control group, after the effects of T1 scores had been controlled. These results suggest that the intervention had significant effect on verbal self-concept scores, averaged across T2 and T3. Furthermore, the interaction between
Group and Time (Est. = -.006, SE = .013) was not significant, demonstrating that the positive effects of the intervention on verbal self-concept were consistent over time (i.e., between T2 and T3).

The results for Model 3 (see Table 7.2) found no significant aptitude-treatment interaction effects present for verbal self-concept. Accordingly, the positive effects on verbal self-concept for the experimental group compared with the control group were present for students with both prior low and high verbal self-concept scores.

**Summary of Results for School Self-Concept**

Overall, the results suggest that the peer support program was successful in enhancing students’ general school and verbal self-concept scores. The findings for general school self-concept showed that, across T2 and T3, students in the experimental group reported higher general school self-concept scores than students in the control group after controlling for the effects of initial scores in this domain. Moreover, support was found for the stability of the effects of the intervention with the positive effects of the intervention on general school self-concept being maintained over time. Consequently, these findings provide support for Hypothesis 2.1. Further tests examining aptitude-treatment interaction effects indicated that students with lower prior levels of general school self-concept especially benefited from the intervention.

In addition, the results were consistent with Hypothesis 2.2, with students in the experimental group reporting higher verbal self-concepts than students in the control group across T2 and T3, after the effects of initial scores in this domain had been controlled. Support was also offered for the stability of the effects of the intervention on verbal self-concept with the positive effects of the intervention being maintained over time. No aptitude-treatment interaction effects were present, suggesting that the intervention was beneficial to students with both prior low and high levels of verbal self-concept.
School Citizenship

**Hypotheses 2.3 and 2.4: Effects on Perceptions of Bullying**

It was hypothesised that participants in the peer support program would report lower pro-bully scores and correspondingly, higher pro-victim scores than students in the control groups and that these differences would be stable over time. A series of models were used to test the effects in these domains for students in the experimental and control groups. A summary of the results for the pro-bully scale is presented in Table 7.3. The results for the baseline components model (Model 1) indicated that most of the variation in pro-bully scores was explained by differences at the individual student level ($\sigma^2_u = .669, SE = .047$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_e = .431, SE = .024$). Calculations of the intra-class correlation indicated that 60.7% of the variance was at the individual student level, 39.1% was at the test occasion level and only 0.2% was at the school level.

A similar pattern of results was found for pro-victim attitudes (see Model 1, Table 7.4), where there was also significant variation between individual students ($\sigma^2_u = .411, SE = .039$) and test occasions ($\sigma^2_e = .536, SE = .030$). However, on this particular scale, there was more variance at the test occasion level (56.5%) than at the individual student level (43.4%). Again, there was little variation between schools ($\sigma^2_v = .001, SE = .003$; i.e., only 0.1%).

In Model 2 for the pro-bully scale, a significant main effect was found for Time (see Table 7.3). The direction of the parameter estimate indicates that pro-bully scores significantly declined from T2 to T3 (Est. = -.046, SE = .018). A significant effect was also found for Group (Est. = -.070, SE = .031). The negative direction of the estimate illustrates that the experimental group reported significantly lower pro-bully scores across T2 and T3 than the control group, after the effects of T1 scores had been taken into account.

While the interaction between Group and Time did not reach significance in Model 2 (Est. = -.036, SE = .019), this interaction did become significant in Model 3 (Est. = -.038, SE = .018). A graph depicting the interaction effects found in Model 3 is presented in Figure 7.7. This graph shows that the experimental group reported
lower pro-bully scores than the control group at T2. Between T2 and T3, participants in the experimental group continued to report decreases in pro-bully attitudes, while the control group scores were fairly stable between these two test occasions. Therefore, these results suggest that a sleeper effect (i.e., a delayed effect of intervention) may have occurred on pro-bully scores for students in the experimental group.

Table 7.3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.029</td>
<td>.017</td>
<td>.016</td>
</tr>
<tr>
<td>T1Bully</td>
<td>.463 (.031)</td>
<td>.459 (.031)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.046 (.018)</td>
<td>-.047 (.018)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>-.070 (.031)</td>
<td>-.070 (.031)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>-.036 (.019)</td>
<td>-.038 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1Bully X Time</td>
<td>-.036 (.019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Bully X Group</td>
<td>-.007 (.031)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Bully X Group X Time</td>
<td>-.005 (.019)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\text{u}} ): between school variance</td>
<td>.002 (.004)</td>
<td>.008 (.009)</td>
<td>.008 (.009)</td>
</tr>
<tr>
<td>( \sigma^2_{\text{v}} ): between student variance</td>
<td>.669 (.047)</td>
<td>.468 (.039)</td>
<td>.469 (.039)</td>
</tr>
<tr>
<td>( \sigma^2_{\text{e}} ): between test occasion variance</td>
<td>.431 (.024)</td>
<td>.417 (.025)</td>
<td>.414 (.024)</td>
</tr>
</tbody>
</table>

*Note. T1Bully = T1 pro-bully; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.*

Further analyses were conducted to test the pro-bully results separately for the experimental and control groups across T2 and T3 (see Appendix F-3). Consistent with Figure 7.7, these results demonstrated that the experimental group reported significant decreases in pro-bully attitudes from T2 to T3 (Est. = -.081, SE = .028), while the control group scores did not differ significantly between these two test occasions (Est. = -.012, SE = .024). Additional analyses were also conducted to
test the pro-bully results separately at T2 and T3 (see Appendix F-4). These results revealed that, while no significant differences were present between the experimental and control group at T2 (Est. = -.035, SE = .035), the disparity between the groups became noticeably significant by T3 (Est. = -.127, SE = .038). Finally, the results for Model 3 show that no aptitude-treatment interaction effects were present for the pro-bully scale.

![Graph showing change in post intervention pro-bully scores (ProBly) for the experimental and control groups across T2 and T3. Post-intervention ProBly scores were standardised in terms of the mean and SD of T1 scores.]

For the pro-victim scale, there was no significant main effect for Group (see Model 2, Table 7.4). This finding indicates that there was no significant difference between the experimental and control groups averaged across T2 and T3. Nevertheless, the Group by Time interaction in this model was significant (Est. = .053, SE = .020). The graph of this interaction (see Figure 7.7) demonstrates that pro-victim scores for students in the experimental group were stable from T2 to T3, while scores for the control group declined between these two test occasions.
Table 7.4

Multilevel Models for Year 7 Students on the Pro-Victim Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.016</td>
<td>-.031</td>
<td>-.029</td>
</tr>
<tr>
<td>T1Victim</td>
<td><strong>.287 (.030)</strong></td>
<td><strong>.291 (.030)</strong></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.032 (.020)</td>
<td>.031 (.020)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.030 (.029)</td>
<td>.032 (.029)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.053 (.020)</td>
<td>.052 (.020)</td>
<td></td>
</tr>
<tr>
<td>T1Victim X Time</td>
<td>-.006 (.021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Victim X Group</td>
<td>-.080 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Victim X Group X Time</td>
<td></td>
<td></td>
<td>.023 (.021)</td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.001 (.003)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_u$: between student variance</td>
<td><strong>.411 (.039)</strong></td>
<td><strong>.368 (.037)</strong></td>
<td><strong>.362 (.037)</strong></td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td><strong>.536 (.030)</strong></td>
<td><strong>.490 (.029)</strong></td>
<td><strong>.488 (.029)</strong></td>
</tr>
</tbody>
</table>

*Note. T1Victim = T1 pro-victim; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.*

Further analyses testing the results separately for the experimental and control groups (see Appendix F-3) revealed that scores for the control group did not differ significantly from T2 to T3 (Est. = -.021, SE = .028). However, consistent with the pattern of results depicted in Figure 7.8, the experimental group reported significantly higher pro-victim scores than the control group across the two post-intervention test occasions (Est. = .086, SE = .028). Additional analyses testing the results separately at T2 and T3 (see Appendix F-4) revealed that the differences between the experimental and groups were not significant at T2 (Est. = -.017, SE = .036). However by T3, the experimental group reported significantly higher pro-victim scores than the control group (Est. = .089, SE = .035). Therefore, these results are suggestive of a sleeper effect on pro-victim scores.
Model 3 for the pro-victim scale also found the presence of a significant aptitude-treatment interaction effect (T1Victim x Group: Est. = -.080, SE = .030). A graph of the interaction is presented in Figure 7.9 to clarify the nature of this interaction. As can be seen, for students with lower T1 pro-victim scores, the scores of the experimental group were higher than the control group. The results for the T1Victim x Group x Time interaction was not significant (see Table 7.4) indicating that the aptitude-treatment interaction effect was maintained over time. This shows that the more positive effects for students with initially lower levels of pro-victim attitudes were evident at T3 as well as T2.
Figure 7.9. Relationship between post-intervention pro-victim scores (ProVictim) and T1 scores (T1ProVictim) for the experimental and control groups. Post-intervention ProVictim scores were standardised in terms of the mean and SD of T1 scores.

Hypothesis 2.5: Effects on Honesty/Trustworthiness

Students participating in the peer support program were predicted to report increases in honesty and truthfulness. The results from models testing the effects of the program on honesty/trustworthiness scores are presented in Table 7.5.

Results from the variance components model (see Model 1) showed that there was considerably more variance at the individual student level ($\sigma^2_w = .868$, $SE = .052$) than at the test occasion level ($\sigma^2_e = .332$, $SE = .018$). However, the variances at both of these levels are significant as the ratio of the parameter estimate to its corresponding standard error is greater than 1.96. Again, there was virtually no variance between schools ($\sigma^2_s = .007$, $SE = .009$). Calculation of the intra-class correlation demonstrated that 71.9% of the variance was at the individual student level, 27.5% was at the test occasion level, and 0.6% was at the school level.

The results for Model 2 (see Table 7.5) show that there was a significant effect of Group for honesty/trustworthiness (Est. = .060, $SE = .029$). The positive direction of the parameter estimate indicates that participants in the experimental
group reported higher honesty/trustworthiness scores across T2 and T3 than participants in the control group, after the effects of corresponding T1 scores were taken into account. The interaction between Group and Time was not significant (Est. = .022, SE = .016), demonstrating that the differences in honesty/trustworthiness between the experimental and the control group were stable between T2 and T3. The results for Model 3 (see Table 7.5) show that there were no significant aptitude-treatment interaction effects present for the honest/trustworthiness scale.

Table 7.5
Multilevel Models for Year 7 Students on the Honesty/Trustworthiness Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.038</td>
<td>-.035</td>
<td>-.035</td>
</tr>
<tr>
<td>T1Honest</td>
<td>.613 (.029)</td>
<td>.614 (.029)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.007 (.016)</td>
<td>-.007 (.016)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.060 (.029)</td>
<td>.060 (.029)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.022 (.016)</td>
<td>.021 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1Honest X Time</td>
<td>.001 (.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Honest X Group</td>
<td>.011 (.029)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Honest X Group X Time</td>
<td>.029 (.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.007 (.009)</td>
<td>.007 (.008)</td>
<td>.007 (.008)</td>
</tr>
<tr>
<td>$\sigma^2_u$: between student variance</td>
<td>.868 (.052)</td>
<td>.497 (.036)</td>
<td>.496 (.036)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td>.332 (.018)</td>
<td>.324 (.018)</td>
<td>.323 (.018)</td>
</tr>
</tbody>
</table>

*Note.* T1Honest = T1 honesty/trustworthiness; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
Summary of Results for School Citizenship

Overall, the results suggest that the peer support program had a positive effect on students' perceptions of bullying and on their honesty/trustworthiness. Consistent with Hypothesis 2.3, students in the experimental group reported lower pro-bullying scores across T2 and T3 than students in the control group, after initial T1 scores in this domain were taken into account. Between T2 and T3, participants in the experimental group continued to report significant decreases in pro-bully attitudes, while the control group scores were fairly stable between these two test occasions. Further results indicated that although the differences between the experimental and control groups were not significant at T2, they were clearly significant by T3. Thus, the results suggest that the program had a delayed positive effect on pro-bully scores (i.e., a sleeper effect), with the effects of the intervention becoming stronger over time. No aptitude treatment interaction effects were present, indicating that the intervention was of equal benefit to students with prior low and high T1 pro-bully scores.

The findings also suggest that the program may have been successful in enhancing participants' pro-victim attitudes. Although there was no significant overall impact on pro-victim scores averaged across T2 and T3, the results are suggestive of a sleeper effect on pro-victim scores at T3. The results showed that students in the experimental group reported significant increases in pro-victim attitudes from T2 to T3, while the control group reported fairly stable scores between these two test occasions. Furthermore, at T3, the differences between the groups in pro-victim scores were noticeably significant.

Further tests examining aptitude-treatment interaction effects further elucidated the results. It appears that participants with lower prior levels of pro-victim attitudes evinced significantly higher scores in this domain than the control group across the two post-intervention test occasions. These findings suggest that the program had a significant immediate impact on pro-victim attitudes for participants with prior low levels in this domain, and for the remaining participants, the impact on pro-victim scores became apparent later on at T3. In consequence, these results provide support for Hypothesis 2.4.

Finally, the results indicate that there was a significant effect of the intervention on honesty/trustworthiness. After controlling for the effects of T1 scores
in this domain, students in the experimental group scored significantly higher on honesty/trustworthiness across T2 and T3 than their counterparts in the control group. The effects of the intervention on honesty/trustworthiness were stable, with the gains found for the experimental group at T2 being maintained over time (i.e., at T3). Thus, these results provide substantive evidence for Hypothesis 2.5. No aptitude-treatment interaction effects were present, suggesting that the intervention was beneficial to students with both prior low and high levels of honesty/trustworthiness.
General Sense of Self

**Hypothesis 2.6: Effects on Self-Confidence**

The results from models used to test the effects of the program on self-confidence scores are presented in Table 7.6. The results for Model 1 demonstrate that there was significant variance at the individual student (\(\sigma^2_{\nu} = .818, SE = .052\)) and test occasion level (\(\sigma^2_{e} = .401, SE = .022\)). However, there was little variation between schools (\(\sigma^2_{\nu} = .010, SE = .012\)). For self-confidence, 66.6% of the variance was at the individual student level, 32.6% was at the test occasion level and 0.8% was at the school level.

Table 7.6

**Multilevel Models for Year 7 Students on the Self-Confidence Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.166</td>
<td>-.173</td>
<td>-.174</td>
</tr>
<tr>
<td>T1SlfCon</td>
<td></td>
<td>.536 (.031)</td>
<td>.533 (.031)</td>
</tr>
<tr>
<td>Time</td>
<td>-.033 (.017)</td>
<td>-.031 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.017 (.031)</td>
<td>.018 (.031)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td></td>
<td>.047 (.017)</td>
<td>.048 (.017)</td>
</tr>
<tr>
<td>T1SlfCon X Time</td>
<td></td>
<td>.011 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1SlfCon X Group</td>
<td></td>
<td>.021 (.031)</td>
<td></td>
</tr>
<tr>
<td>T1SlfCon X Group X Time</td>
<td></td>
<td>-.035 (.018)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\sigma^2_{\nu} ): between school variance</td>
<td>.010 (.012)</td>
<td>.008 (.009)</td>
<td>.008 (.009)</td>
</tr>
<tr>
<td>(\sigma^2_{e} ): between student variance</td>
<td>.818 (.052)</td>
<td>.545 (.040)</td>
<td>.548 (.040)</td>
</tr>
<tr>
<td>(\sigma^2_{e} ): between test occasion variance</td>
<td>.401 (.022)</td>
<td>.390 (.022)</td>
<td>.386 (.022)</td>
</tr>
</tbody>
</table>

*Note. T1SlfCon = T1 self-confidence; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.*
In Model 2 (see Table 7.6), there was no significant main effect for Group. This finding suggests that there was no significant overall impact on self-confidence scores, averaged across T2 and T3. However, the Group by Time interaction in this model was significant (Est. = .047, SE = .017). The graph of this interaction (see Figure 7.10) demonstrates that students in the experimental group reported increases in self-confidence from T2 to T3, while the control group reported clear declines between these two test occasions. Therefore, these results suggest that the program may have had a sleeper effect on self-confidence scores for students in the experimental group.

Further analyses were conducted to test self-confidence scores separately for the experimental and control groups over T2 to T3 (see Appendix F-3). These tests showed that self-confidence scores for the control group significantly declined from T2 to T3 (Est. = -.080, SE = .024). Although the experimental group scores increased from T2 to T3, the differences were not significant (Est. = .016, SE = .025). Additional analyses which were carried out to test the results separately at T2 and T3 (see Appendix F-4) revealed, however, that the difference between the experimental and control groups was not significant at either T2 (Est. = -.028, SE = .035) or T3 (Est. = .067, SE = .036). The results for Model 3 (see Table 7.6) showed that there were no significant aptitude-treatment interactions effects present for the self-confidence scale.
In Model 2 (see Table 7.6), there was no significant main effect for Group. This finding suggests that there was no significant overall impact on self-confidence scores, averaged across T2 and T3. However, the Group by Time interaction in this model was significant (Est. = .047, SE = .017). The graph of this interaction (see Figure 7.10) demonstrates that students in the experimental group reported increases in self-confidence from T2 to T3, while the control group reported clear declines between these two test occasions. Therefore, these results suggest that the program may have had a sleeper effect on self-confidence scores for students in the experimental group.

Further analyses were conducted to test self-confidence scores separately for the experimental and control groups over T2 to T3 (see Appendix F-3). These tests showed that self-confidence scores for the control group significantly declined from T2 to T3 (Est. = -.080, SE = .024). Although the experimental group scores increased from T2 to T3, the differences were not significant (Est. = .016, SE = .025). Additional analyses which were carried out to test the results separately at T2 and T3 (see Appendix F-4) revealed, however, that the difference between the experimental and control groups was not significant at either T2 (Est. = -.028, SE = .035) or T3 (Est. = .067, SE = .036). The results for Model 3 (see Table 7.6) showed that there were no significant aptitude-treatment interactions effects present for the self-confidence scale.
Figure 7.10. Change in post-intervention self-confidence scores (SilfCon) for the experimental and control groups across T2 and T3. Post-intervention SilfCon scores were standardised in terms of the mean and SD of T1 scores.

**Hypothesis 2.7: Effects on Global Self-Esteem**

The peer support program was hypothesised to have a positive impact on student’s global self-esteem scores. A summary of the results from models used to test the main effects and interactions are presented in Table 7.7. The estimates for the baseline components model (Model 1) indicate that the intercepts of the three different schools do not differ significantly from one another ($\sigma^2_\gamma = .032$, $SE = .029$). However, the variances are significant at the individual student ($\sigma^2_\epsilon = .889$, $SE = .053$) and test occasion level ($\sigma^2_\nu = .326$, $SE = .018$). Calculation of the intra-class correlation revealed that 71.3% of the variance in global self-esteem was at the individual student level, 26.1% was at the test occasion level, and 2.6% was at the school level.

For Model 2, no significant effects for Group or the Group by Time interaction were found for global self-esteem (see Table 7.7). In addition, there were no significant aptitude-treatment interaction effects present in Model 3. Therefore, these results suggest that the peer support program was not successful in enhancing the global self-esteem of students in the experimental group.
Table 7.7
Multilevel Models for Year 7 Students on the Global Self-Esteem Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.103</td>
<td>-.084</td>
<td>-.086</td>
</tr>
<tr>
<td>T1GnSlf</td>
<td>.579 (.030)</td>
<td>.579 (.030)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.039 (.016)</td>
<td>-.039 (.016)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>-.020 (.030)</td>
<td>-.020 (.030)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.021 (.016)</td>
<td>.023 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1SlfEst X Time</td>
<td></td>
<td>-.016 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1SlfEst X Group</td>
<td></td>
<td>-.033 (.030)</td>
<td></td>
</tr>
<tr>
<td>T1SlfEst X Group X Time</td>
<td></td>
<td></td>
<td>.008 (.016)</td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between school variance</td>
<td>.032 (.029)</td>
<td>.024 (.022)</td>
<td>.025 (.022)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between student variance</td>
<td>.889 (.053)</td>
<td>.526 (.037)</td>
<td>.526 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_{\zeta}$: between test occasion variance</td>
<td>.326 (.018)</td>
<td>.320 (.018)</td>
<td>.319 (.018)</td>
</tr>
</tbody>
</table>

_Note._ T1SlfEst = T1 global self-esteem; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

**Summary of Results for General Sense of Self**

The results provided some evidence that the intervention enhanced students’ self-confidence. Although there was no significant impact on self-confidence averaged across T2 and T3, there was indication that there may have been a sleeper effect on self-confidence scores at T3 and hence, providing partial support for Hypothesis 2.6. The results showed that students in the control group reported significant decreases in self-confidence from T2 to T3, while the experimental group scores were fairly stable between these two test occasions. However, further analyses conducted separately at T2 and T3 found that the differences between the experimental and control group were non-significant at either of these test occasions.
The results for global self-esteem were inconsistent with Hypothesis 2.7, as the intervention appeared to be unable to provide significant changes in students’ global self-esteem scores.
**Connectedness**

*Hypotheses 2.8 and 2.9: Effects on Peer Relations*

It was hypothesised that participants in the peer support program would report higher same-sex and opposite-sex relation self-concepts than students in the control groups and that these differences would be stable over time.

A summary of the results for same-sex relations is presented in Table 7.8. The baseline components model for same-sex relations (Model 1) detected significant variance at the individual student ($\sigma^2_\nu: = .588, SE = .041$) and test occasion level ($\sigma^2_\epsilon: = .401, SE = .022$). Calculation of the intra-class correlation established that 59.5% of the variance was at the individual student level and 40.5% was at the test occasion level.

| Table 7.8 |
| Multilevel Models for Year 7 Students on the Same-Sex Relations Self-Concept Scale |

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.001</td>
<td>-.001</td>
<td>-.001</td>
</tr>
<tr>
<td>T1SmeSx</td>
<td>.435 (.027)</td>
<td>.435 (.028)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.040 (.017)</td>
<td>-.040 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>-.003 (.028)</td>
<td>-.003 (.028)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.014 (.17)</td>
<td>.015 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1SmeSx X Time</td>
<td>-.032 (.17)</td>
<td>-.017 (.027)</td>
<td></td>
</tr>
<tr>
<td>T1SmeSx X Group</td>
<td>-.017 (.027)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SmeSx X Group X Time</td>
<td>.028 (.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_\nu$: between school variance</td>
<td>.000 (.000)</td>
<td>.003 (.004)</td>
<td>.003 (.004)</td>
</tr>
<tr>
<td>$\sigma^2_\nu$: between student variance</td>
<td>.588 (.041)</td>
<td>.380 (.033)</td>
<td>.383 (.033)</td>
</tr>
<tr>
<td>$\sigma^2_\epsilon$: between test occasion variance</td>
<td>.401 (.022)</td>
<td>.398 (.022)</td>
<td>.394 (.022)</td>
</tr>
</tbody>
</table>

*Note.* T1SmeSx = T1 same-sex relations; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
A similar pattern of results was found for the opposite-sex relations self-concept scale (see Model 1, Table 7.9) where significant variance was found between individual students ($\sigma^2_{x_i} = .645, SE = .039$) and test occasions ($\sigma^2_{t} = .272, SE = .015$). For opposite-sex relations, 69.8% was at the individual student level, 29.4% was at the test occasion level and 0.8% was at the school level. For both scales, the results found that the intercepts of the different schools do not differ significantly from one another (Same-sex $\sigma^2_x = .000, SE = .000$; Opposite-sex $\sigma^2_x = .007, SE = .008$).

Table 7.9
Multilevel Models for Year 7 Students on the Opposite-Sex Relations Self-Concept Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.089</td>
<td>.079</td>
<td>.078</td>
</tr>
<tr>
<td>T1OppSx</td>
<td>.600 (.024)</td>
<td>.597 (.024)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.018 (.014)</td>
<td>.017 (.014)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.072 (.024)</td>
<td>.073 (.024)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.009 (.014)</td>
<td>.008 (.014)</td>
<td></td>
</tr>
<tr>
<td>T1OppSx X Time</td>
<td></td>
<td>-.059 (.014)</td>
<td></td>
</tr>
<tr>
<td>T1OppSx X Group</td>
<td></td>
<td>-.057 (.024)</td>
<td></td>
</tr>
<tr>
<td>T1OppSx X Group X Time</td>
<td></td>
<td>-.003 (.014)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_x$: between school variance</td>
<td>.007 (.008)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_x$: between student variance</td>
<td>.645 (.039)</td>
<td>.300 (.025)</td>
<td>.301 (.024)</td>
</tr>
<tr>
<td>$\sigma^2_x$: between test occasion variance</td>
<td>.272 (.015)</td>
<td>.278 (.015)</td>
<td>.271 (.015)</td>
</tr>
</tbody>
</table>

*Note.* T1OppSx = T1 opposite-sex relations; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
Model 2 for same-sex relations self-concept (see Table 7.8) found no significant effects for Group (Est. = -.003, SE = .028) or for the Group x Time interaction (Est. = .014, SE = .017). The results for Time indicate that, across groups, same-sex relation self-concept scores significantly decreased from T2 to T3 (Est. = -.040, SE = .017). In addition, there were no significant aptitude-treatment interactions present in Model 3. Consequently, these results suggest that the peer support program was not successful in enhancing the same-sex relations of students in the experimental group.

For opposite-sex relations, a significant main effect was found for Group (Est. = .072, SE = .024). The slope was positive, which indicates that participants in the experimental group reported higher opposite-sex relations across T2 and T3 than participants in the control group, after the corresponding T1 scores were taken into account. The Group x Time was not significant (Est. = .014, SE = .017), which demonstrates that the positive effects of the intervention on opposite-sex relations were maintained over time (i.e., between T2 and T3).

The results for Model 3 revealed that the T1OppSx x Group interaction was significant (Est. = -.057, SE = .024). Figure 7.11 illustrates that participants with lower T1 opposite-sex relations scores evidenced higher opposite-sex relations self-concept scores across T2 and T3 than participants in the control group. The results for the T1OppSx x Group x Time interaction was not significant, which indicates that this aptitude-treatment interaction effect was stable from T2 to T3.
Figure 7.11. Relationship between post-intervention opposite-sex relations self-concept scores (OppSx) and corresponding T1 scores (T1OppSx) for the experimental and control groups. Post-intervention OppSx scores were standardised in terms of the mean and SD of T1 scores.

Hypothesis 2.10: Effects on Cooperative Teamwork

The peer support program was hypothesised to enhance cooperative teamwork scores that would remain stable over time. A series of models were used to test the effects of the program on cooperative teamwork for participants in the experimental and control groups. The results from these models are presented in Table 7.10.

As shown in Table 7.10, the baseline components model indicates that there was significant variance between individual students (Est. = .897, SE = .054) and test occasions (Est. = .373, SE = .020). Of the estimated total variance, 70.2% was due to differences between individual students and 29.2% due to differences between test occasions. Only 0.6% of the variance was at the school level (Est. = .008, SE = .010).
### Table 7.10

**Multilevel Models for Year 7 Students on the Cooperative Teamwork Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.180</td>
<td>-.180</td>
<td>-.184</td>
</tr>
<tr>
<td>T1Coteam</td>
<td>.627 (.030)</td>
<td>.632 (.030)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.045 (.016)</td>
<td>-.047 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>-.001 (.030)</td>
<td>-.002 (.030)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.046 (.017)</td>
<td>.046 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1Coteam X Time</td>
<td></td>
<td>-.009 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1Coteam X Group</td>
<td></td>
<td>.066 (.030)</td>
<td></td>
</tr>
<tr>
<td>T1Coteam X Group X Time</td>
<td></td>
<td>.013 (.017)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_z$: between school variance</td>
<td>.008 (.010)</td>
<td>.003 (.004)</td>
<td>.003 (.005)</td>
</tr>
<tr>
<td>$\sigma^2_u$: between student variance</td>
<td>.897 (.054)</td>
<td>.502 (.037)</td>
<td>.496 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion</td>
<td>.373 (.020)</td>
<td>.365 (.020)</td>
<td>.366 (.020)</td>
</tr>
</tbody>
</table>

**Note.** T1Coteam = Time 1 cooperative teamwork; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

In Model 2 (see Table 7.10), the results for Time indicated that, across groups, cooperative teamwork scores significantly declined between T2 and T3 (Est. = -.045, $SE = .016$). No significant effects for Group were found, which suggests that there was no significant difference between the experimental and control groups averaged across T2 and T3. However, the Group by Time interaction in this model was significant (Est. = .046, $SE = .017$). The graph of this interaction (see Figure 7.12) demonstrates that students in the experimental group scores were fairly stable between T2 and T3, while the control group reported a sharp decline between these two test occasions. In consequence, these are suggestive of a sleeper effect on cooperative teamwork scores for students in the experimental group at T3.

Further analyses testing the results separately for the experimental and control groups (see Appendix F-3) revealed that cooperative teamwork scores declined significantly for the control group from T2 to T3 (Est. = -.090, $SE = .023$).
For the experimental group, cooperative teamwork scores increased marginally from T2 to T3, though these differences were not significant (Est. = .002, SE = .023). Additional analyses were carried out to test the results separately at T2 and T3 (see Appendix F-4), which revealed, however, that the difference between the experimental and control groups was not significant at either T2 (Est. = -.048, SE = .032) or T3 (Est. = .043, SE = .037).

![Graph showing change in post intervention cooperative teamwork scores (CoTeam) for the experimental and control groups across T2 and T3. Post-intervention CoTeam scores were standardised in terms of the mean and SD of T1 scores.](image)

**Figure 7.12.** Change in post intervention cooperative teamwork scores (CoTeam) for the experimental and control groups across T2 and T3. Post-intervention CoTeam scores were standardised in terms of the mean and SD of T1 scores.

The results for Model 3 demonstrate that the T1CoTeam x Group interaction was significant (Est. = .045, SE = .017). The graph of this interaction (see Figure 7.13) shows that the two independent variables tend to reverse each other's effects (i.e., an antagonistic interaction; McBurney, 1994), which elucidates the non-significant effect of Group reported in Model 2. As can be seen, for students with lower pre-test scores, the experimental group reported lower cooperative teamwork scores than the control group suggesting that the intervention impacted positively on students with prior higher scores. Possibly, students who reported higher T1 cooperative teamwork scores were better able to take advantage of the cooperative opportunities than students with lower T1 scores in this domain.
Figure 7.13. Relationship between post intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups. Post-intervention CoTeam scores were standardised in terms of the mean and SD of T1 scores.

Hypothesis 2.11: Effects on Peer Support

It was hypothesised that participants in the intervention would report higher peer support scores and that these gains would be maintained over time. A summary of the results for the peer support scale are presented in Table 7.11. The baseline components model for peer support (Model 1) detected significant variance between individual students ($\sigma^2_\nu = .722$, $SE = .049$) and test occasions ($\sigma^2_\tau = .428$, $SE = .024$). For this scale, 62.8% of the variance was at the individual student level and 37.2% was at the test occasion level. The intercepts of the different schools did not differ from one another ($\sigma^2_\gamma = .000$, $SE = .000$).

For Model 2, there was no significant main effect for Group (see Table 7.11). This finding indicates that there was no significant difference in peer support scores between the experimental and control groups averaged across T2 and T3. However, the Group by Time interaction in this model was significant (Est. = .041, $SE = .018$). The graph of this interaction (see Figure 7.14) demonstrates that students in the experimental group reported increases in peer support from T2 to T3, while the
control group reported declines between these two test occasions. Thus, it appears that the program may have had a sleeper effect on peer support scores for students in the experimental group.

Table 7.11

Multilevel Models for Year 7 Students on the Peer Support Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est.</td>
<td>Est.</td>
<td>Est.</td>
</tr>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.069</td>
<td>-.066</td>
<td>-.065</td>
</tr>
<tr>
<td>T1PerSup</td>
<td></td>
<td>.482 (.030)</td>
<td>.477 (.030)</td>
</tr>
<tr>
<td>Time</td>
<td>.014 (.018)</td>
<td>.014 (.018)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.009 (.030)</td>
<td>.010 (.030)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.041 (.018)</td>
<td>.042 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1PerSup X Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PerSup X Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PerSup X Group X Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_\alpha$: between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_\beta$: between student variance</td>
<td>.722 (.049)</td>
<td>.488 (.039)</td>
<td>.491 (.039)</td>
</tr>
<tr>
<td>$\sigma^2_\gamma$: between test occasion variance</td>
<td>.428 (.024)</td>
<td>.412 (.024)</td>
<td>.404 (.023)</td>
</tr>
</tbody>
</table>

*Note.* T1PerSup = T1 peer support; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

Further analyses were conducted to test the peer support results separately for the experimental and control groups across T2 and T3 (see Appendix F-3). Consistent with Figure 7.14, these results demonstrated that the experimental group reported increases in peer support from T2 to T3, however, these differences were not significant (Est. = .051, SE = .028). Furthermore, the control group scores declined, but not significantly, over these two test occasions (Est. = -.023, SE = .022). Hence, whereas the decline for the control group was significantly different from the increase for the experimental group (as demonstrated by the significant
group x time interaction), the effect of time was not statistically significant for either group considered separately. Moreover, further analyses indicated that the differences between the experimental and control groups were not significant at either T2 (Est. = -.037, SE = .034) or T3 (Est. = .058, SE = .038) (see Appendix F-4). The results for Model 3 (see Table 7.11) show that there were no significant aptitude-treatment interaction effects present for the peer support scale.

![Graph showing changes in PerSup scores over time for experimental and control groups.](image)

*Figure 7.14.* Changes in post intervention peer support scores (PerSup) for the experimental and control groups across T2 and T3. Post-intervention PerSup scores were standardised in terms of the mean and SD of T1 scores.

**Summary of Results for Connectedness**

The results provide partial support for the capacity of the intervention to enhance student peer relations. Although it appears that there was no significant impact on same-sex relations self-concept, there is strong evidence to suggest that the program had a notable effect on opposite-sex relations self-concept. Across the two post intervention test occasions, students in the experimental group reported significantly higher opposite-sex relation self-concept scores than students in the control group after controlling for the effects of corresponding T1 scores. Moreover, support was found for the stability of the effects of the intervention with the effects
of the intervention on opposite-sex relations self-concept being maintained over time. Thus, these results provide support for Hypothesis 2.9. Further tests examining aptitude-treatment interaction effects, indicated that students with lower T1 opposite-sex relations self-concept benefited especially from the intervention.

The findings also suggest that the program may have been successful in enhancing both cooperative teamwork and peer support. Although there was no significant overall impact on cooperative teamwork and peer support scores, averaged across T2 and T3, there was indication that there may have been a sleeper effect on these scale scores at T3 and thus, providing partial support for Hypothesis 2.10 and Hypothesis 2.11. For cooperative teamwork, the results showed that students' scores in the experimental group were stable from T2 to T3, while the control group reported significant declines in cooperative teamwork between these two test occasions. Similarly, the results for peer support indicated that students' scores in the experimental group increased from T2 to T3, while the control group reported declines in peer support between these two test occasions. However, further analyses indicated that the differences between the experimental and control group on cooperative teamwork and peer support scores were not significant at either T2 or T3.
Resourcefulness

Hypotheses 2.12 to 2.14: Effects on Coping Strategies

The peer support program was anticipated to have a positive impact on coping strategies. In particular, the experimental group was hypothesised to report higher scores for problem solving and support seeking, as well as lower scores for problem avoidance, than the control group. The results from models used to test the effects of the program on problem solving are presented in Table 7.12. The results for the baseline components model (Model 1) indicated that most of the variation in problem solving could be explained by differences at the individual student level ($\sigma^2_w = .678, SE = .046$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_e = .380, SE = .021$). Calculations of the intra-class correlation indicated that 62.1% of the variance was at the individual student level, 34.8% was at the test occasion level and only 3.1% was at the school level.

Table 7.12 shows that there were no significant effects for problem solving due to Group (Est. = .017, SE = .030) or the Group by Time interaction (Est. = -.033, SE = .017) in Model 2. A significant main effect was found for Time (Est. = -.052, SE = .017), demonstrating that, on average, problem solving scores significantly declined between T2 and T3. There were no significant aptitude-treatment interaction effects present in Model 3. Thus, these results indicate that the peer support program was not successful in enhancing the problem solving strategies of students in the experimental group.

A summary of the results for support seeking is presented in Table 7.13. The results for Model 1 demonstrated that there was significant variance at the individual student level ($\sigma^2_w = .678, SE = .046$) and test occasion level ($\sigma^2_e = .380, SE = .021$). There was little variation between the schools ($\sigma^2_s = .034, SE = .030$). For this outcome, 62.1% of the variance was at the individual student level, 34.8% was at the test occasion level and 3.1% was at the school level.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.073</td>
<td>-.077</td>
<td>-.077</td>
</tr>
<tr>
<td>T1PrbSlv</td>
<td>.439 (.031)</td>
<td>.439 (.031)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.052 (.017)</td>
<td>-.054 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.017 (.030)</td>
<td>.017 (.030)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>-.033 (.017)</td>
<td>-.033 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1PrbSlv X Time</td>
<td>-.011 (.018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PrbSlv X Group</td>
<td>-.008 (.031)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PrbSlv X Group X Time</td>
<td>.029 (.018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\text{between}}$</td>
<td>.034 (.030)</td>
<td>.017 (.016)</td>
<td>.017 (.016)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{between}}$</td>
<td>.678 (.046)</td>
<td>.497 (.039)</td>
<td>.498 (.039)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{between}}$</td>
<td>.380 (.021)</td>
<td>.371 (.022)</td>
<td>.370 (.022)</td>
</tr>
</tbody>
</table>

*Note.* T1PrbSlv = T1 problem solve; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

Results of Model 2 for support seeking (see Table 7.13) showed that no significant effects for Group (Est. = .038, SE = .027) or for the Group x Time interaction (Est. = .021, SE = .017) were present. However, the results for Model 3 showed that the T1SupSek x Group interaction was significant (Est. = -.072, SE = .027). Figure 7.15 illustrates that participants with lower T1 support seeking scores reported significantly higher support seeking scores across the post-intervention test occasions than participants in the control group. Furthermore, the results for the T1SupSek x Group x Time interaction was not significant, which demonstrates that the effects of the aptitude treatment interaction (T1SupsSek x Group interaction) were maintained over time.
Table 7.13
Multilevel Models for Year 7 Students on the Support Seeking Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.012</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td>T1SupSek</td>
<td>0.470 (.027)</td>
<td>0.470 (.027)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-0.002 (.017)</td>
<td>-0.002 (.016)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>0.038 (.027)</td>
<td>0.038 (.027)</td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td></td>
<td>0.021 (.017)</td>
<td>0.022 (.017)</td>
</tr>
<tr>
<td>T1SupSek X Time</td>
<td></td>
<td></td>
<td>-0.029 (.017)</td>
</tr>
<tr>
<td>T1SupSek X Group</td>
<td></td>
<td></td>
<td>-0.072 (.027)</td>
</tr>
<tr>
<td>T1SupSek X Group X Time</td>
<td></td>
<td></td>
<td>-0.004 (.017)</td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>0.010 (.011)</td>
<td>0.000 (.000)</td>
<td>0.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_w$: between student variance</td>
<td>0.594 (.040)</td>
<td>0.372 (.031)</td>
<td>0.368 (.031)</td>
</tr>
<tr>
<td>$\sigma^2_u$: between test occasion variance</td>
<td>0.343 (.019)</td>
<td>0.341 (.020)</td>
<td>0.339 (.020)</td>
</tr>
</tbody>
</table>

Note. T1SupSek = Time 1 support seek; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

Figure 7.15. Relationship between post-intervention support seeking scores (SupSek) and corresponding T1 scores (T1SupSek) for the experimental and control groups. Post-intervention SupSek scores were standardised in terms of the mean and SD of T1 scores.
For problem avoidance (see Table 7.14), the results for the baseline model indicated that there was significant variance at the individual student ($\sigma^2_w = .630, SE = .042$) and test occasion level ($\sigma^2_e = .343, SE = .019$). Again, there was virtually no variation between the schools ($\sigma^2_v = .007, SE = .008$). Calculation of the intra-class correlation indicates that 64.3% of the variance was at the individual student level, 35% was at the test occasion level and only .7% was at the school level.

Table 7.14

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.126</td>
<td>-.159</td>
<td>-.163</td>
</tr>
<tr>
<td>T1Avoid</td>
<td></td>
<td>.508 (.027)</td>
<td>.502 (.027)</td>
</tr>
<tr>
<td>Time</td>
<td>-.039 (.016)</td>
<td>-.039 (.016)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.009 (.027)</td>
<td>.008 (.027)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>-.046 (.016)</td>
<td>-.049 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1Avoid X Time</td>
<td></td>
<td>-.033 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1Avoid X Group</td>
<td>-.044 (.027)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Avoid X Group X Time</td>
<td>-.004 (.016)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.007 (.008)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_w$: between student variance</td>
<td>.630 (.042)</td>
<td>.358 (.030)</td>
<td>.356 (.030)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td>.343 (.019)</td>
<td>.326 (.019)</td>
<td>.325 (.019)</td>
</tr>
</tbody>
</table>

*Note.* T1Avoid = T1 problem avoidance; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

For Model 2 (see Table 7.14), there was no significant main effect for Group (Est. = .038, SE = .027). This finding indicates that there was no significant effect of the program on problem avoidance scores averaged across T2 and T3. However, the Group by Time interaction in this model was significant (Est. = -.046, SE = .016). The graph of this interaction (see Figure 7.16) suggests students in the experimental
group reported significant declines in problem avoidance from T2 to T3, while the results for the control group were fairly stable between these two test occasions. Therefore, these results suggest that the program may have had a sleeper effect on the problem avoidance scores for students in the experimental group at T3.

Further analyses conducted to test the results separately for the experimental and control groups (see Appendix F-3) demonstrated that the experimental group reported significant decreases in problem avoidance scores from T2 to T3 (Est. = - .085, \( SE = .024 \)). On the other hand, scores in this domain did not differ significantly for the control group over T2 to T3 (Est. = .006, \( SE = .022 \)). Additional analyses were also carried out to test the results separately at T2 and T3 (see Appendix F-3), which revealed, however, that the difference between the experimental and control groups was not significant at either T2 (Est. = .058, \( SE = .030 \)) or T3 (Est. = -.062, \( SE = .034 \)). The results for Model 3 show that no significant aptitude-treatment interaction effects were present for the problem avoidance scale.

![Graph](image)

*Figure 7.16.* Change in post intervention problem avoidance scores (Avoid) for the experimental and control groups across T2 and T3. Post-intervention Avoid scores were standardised in terms of the mean and SD of T1 scores.
Hypothesis 2.15: Effects on Open Thinking

The results from models testing the effects of the program on open thinking are presented in Table 7.15. Results from the variance components model (see Model 1) showed that there was considerably more variance at the individual student level ($\sigma^2_i$: = .789, $SE$ = .049) than at the test occasion level ($\sigma^2_t$: = .355, $SE$ = .019). Variances at both of these levels are significant because the ratio of the parameter estimate to its corresponding standard error is greater than 1.96. There was virtually no variance between schools ($\sigma^2_s$: = .009, $SE$ = .010). Calculation of the intra-class correlation demonstrated that 68.4% of the variance was at the individual student level, 30.8% was at the test occasion level, and 0.8% was at the school level.

Table 7.15
Multilevel Models for Year 7 Students on the Open Thinking Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.091</td>
<td>-.089</td>
<td>-.090</td>
</tr>
<tr>
<td>T1OpnThnk</td>
<td></td>
<td>.531 (.030)</td>
<td>.533 (.030)</td>
</tr>
<tr>
<td>Time</td>
<td>-.026 (.016)</td>
<td>-.026 (.016)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.067 (.030)</td>
<td>.067 (.030)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.011 (.016)</td>
<td>.011 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1OpnThnk X Time</td>
<td></td>
<td>.012 (.016)</td>
<td></td>
</tr>
<tr>
<td>T1OpnThnk X Group</td>
<td></td>
<td>-.013 (.030)</td>
<td></td>
</tr>
<tr>
<td>T1OpnThnk X Group X Time</td>
<td></td>
<td>-.002 (.016)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_s$: between school variance</td>
<td>.009 (.010)</td>
<td>.006 (.007)</td>
<td>.005 (.007)</td>
</tr>
<tr>
<td>$\sigma^2_i$: between student variance</td>
<td>.789 (.049)</td>
<td>.518 (.037)</td>
<td>.517 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_t$: between test occasion variance</td>
<td>.355 (.019)</td>
<td>.341 (.019)</td>
<td>.341 (.019)</td>
</tr>
</tbody>
</table>

*Note.* T1OpnThnk = T1 open thinking; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
The results for Model 2 (see Table 7.15) show that there was a significant effect of Group for the open thinking scale (Est. = .067, SE = .030). The positive direction of the parameter estimate indicates that participants in the experimental group reported significantly higher open thinking scores across T2 and T3 than participants in the control group, after the effects of corresponding T1 scores were controlled. The interaction between Group and Time was not significant (Est. = .011, SE = .016), demonstrating that the positive effects of the intervention on open thinking were stable over time. No significant aptitude-treatment interaction effects were present for the open thinking scale for Model 3 (see Table 7.17).

**Hypothesis 2.16: Effects on Coping with Change**

A summary of the results for the coping with change scale are presented in Table 7.16. The baseline components model for coping with change (Model 1) detected significant variance between individual students ($\sigma^2_{u}$: = .702, SE = .046) and test occasions ($\sigma^2_{\tau}$: = .399, SE = .022). The intercepts of the different schools did not differ significantly from one another ($\sigma^2_{\alpha}$: = .039, SE = .035). Calculation of the intra-class correlation determined that 65.0% of the variance was at the individual student level, 31.4% was at the test occasion level, and only 3.6% was at the school level.

Although the parameter estimates in Model 2 were in the anticipated direction (see Table 7.15), neither the effects for Group (Est. = .019, SE = .030) nor for the Group x Time interaction (Est. = .028, SE = .017) were significant. In addition, there were no significant aptitude treatment interactions present in Model 3. In summary, the results suggest that the peer support program was not successful in enhancing the coping with change scores for students in the experimental group.
Table 7.16

**Multilevel Models for Year 7 Students on the Coping with Change Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.086</td>
<td>-.088</td>
<td>-.087</td>
</tr>
<tr>
<td>T1CpeChg</td>
<td></td>
<td><strong>.483 (.030)</strong></td>
<td><strong>.476 (.030)</strong></td>
</tr>
<tr>
<td>Time</td>
<td>.003 (.017)</td>
<td>.003 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.019 (.030)</td>
<td>.019 (.029)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.028 (.017)</td>
<td>.027 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1CpeChg X Time</td>
<td></td>
<td>-.002 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1CpeChg X Group</td>
<td>.056 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1CpeChg X Group X Time</td>
<td></td>
<td>.003 (.017)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.039 (.035)</td>
<td>.027 (.024)</td>
<td>.028 (.025)</td>
</tr>
<tr>
<td>$\sigma^2_u$: between student variance</td>
<td><strong>.702 (.046)</strong></td>
<td><strong>.470 (.037)</strong></td>
<td><strong>.466 (.037)</strong></td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td><strong>.399 (.022)</strong></td>
<td><strong>.400 (.022)</strong></td>
<td><strong>.401 (.022)</strong></td>
</tr>
</tbody>
</table>

*Note.* T1CpeChg = T1 coping with change; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

**Hypothesis 2.17: Effects on Time Efficiency**

The results from models used to test the effects of the program on time efficiency scores are presented in Table 7.17. The results for Model 1 demonstrate that there was significant variance at the individual student ($\sigma^2_u: = .694, SE = .045$) and test occasion level ($\sigma^2_e = .371, SE = .020$). There was little variation between the schools ($\sigma^2_v = .031, SE = .028$). For this scale, 63.3% of the variance was at the individual student level, 33.9% was at the test occasion level and 2.8% was at the school level.
Table 7.17

Multilevel Models for Year 7 Students on the Time Efficiency Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.154</td>
<td>-.148</td>
<td>-.147</td>
</tr>
<tr>
<td>T1TimeEffc</td>
<td>.510 (.028)</td>
<td>.509 (.029)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.016 (.017)</td>
<td>.017 (.017)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.044 (.028)</td>
<td>.044 (.028)</td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.049 (.017)</td>
<td>.050 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1TimeEffc X Time</td>
<td>-.007 (.017)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1TimeEffc X Group</td>
<td>-.012 (.029)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1TimeEffc X Group X Time</td>
<td>-.008 (.017)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\tau}$: between school variance</td>
<td>.031 (.028)</td>
<td>.018 (.017)</td>
<td>.018 (.017)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between student variance</td>
<td>.694 (.045)</td>
<td>.426 (.034)</td>
<td>.426 (.034)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between test occasion variance</td>
<td>.371 (.020)</td>
<td>.368 (.020)</td>
<td>.368 (.020)</td>
</tr>
</tbody>
</table>

Note. T1TimeEffc = T1 time efficiency; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.

In Model 2 (see Table 7.17), there was no significant main effect for Group (Est. = .044, SE = .028). This finding suggests that there was no significant impact on time efficiency scores averaged across T2 and T3. Nevertheless, the Group by Time interaction in this model was significant (Est. = .049, SE = .017). The graph of this interaction (see Figure 7.17) demonstrates that students in the experimental group reported an increase in time efficiency from T2 to T3, while the control group reported fairly stable scores between these two test occasions. Thus, these results suggestive of a sleeper effect on time efficiency scores at T3.

Further analyses were conducted to test the time-efficiency results separately for the experimental and control groups across T2 and T3 (see Appendix F-3). Consistent with Figure 7.7, these results demonstrated that the experimental group reported significant increases in time efficiency scores from T2 to T3 (Est. = .064, SE = .026). However, scores for the control group scores did not differ significantly
between these two test occasions (Est. = -.030, SE = .021). Additional analyses were also conducted to test the time-efficiency results separately at T2 and T3 (see Appendix F-4). These results revealed that, while no significant differences were present between the experimental and control group at T2 (Est. = -.012, SE = .033), the disparity between the groups became noticeably significant by T3 (Est. = .096, SE = .034).

![Graph](image)

**Figure 7.17.** Change in post intervention time efficiency scores (TmeEfc) for the experimental and control groups across T2 and T3. Post-intervention TmeEfc scores were standardised in terms of the mean and SD of T1 scores.

**Hypothesis 2.18: Effects on Stress Management**

It was hypothesised that participants in the peer support program would report higher stress management scores than students in the control groups and that these gains would be maintained over time. A summary of the results from models testing the effects of the peer support program on stress management can be seen in Table 7.18. The findings for the baseline components model (Model 1) indicates that there was significant variance at the individual student ($\sigma^2_u = .669$, $SE = .045$) and test occasion level ($\sigma^2_e = .477$, $SE = .026$). However, the results show that there was little variation between schools ($\sigma^2_v = .024$, $SE = .023$). Calculation of the intra-class
correlations indicate that 57.2% of the variance was at the individual student level, 40.8% was at the test occasion level and 2.0% was at the school level.

Table 7.18
Multilevel Models for Year 7 Students on the Stress Management Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.068</td>
<td>-.056</td>
<td>-.055</td>
</tr>
<tr>
<td>T1StrsMg</td>
<td>.524 (.029)</td>
<td>.521 (.029)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.048 (.018)</td>
<td>.048 (.018)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.059 (.029)</td>
<td>.060 (.029)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.017 (.018)</td>
<td>.018 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1StrsMg X Time</td>
<td></td>
<td>-.039 (.019)</td>
<td></td>
</tr>
<tr>
<td>T1StrsMg X Group</td>
<td>-.026 (.029)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1StrsMg X Group X Time</td>
<td></td>
<td>.001 (.019)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_k$: between school variance</td>
<td>.024 (.023)</td>
<td>.011 (.011)</td>
<td>.010 (.011)</td>
</tr>
<tr>
<td>$\sigma^2_s$: between student variance</td>
<td>.669 (.048)</td>
<td>.415 (.037)</td>
<td>.416 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_2$: between test occasion variance</td>
<td>.477 (.026)</td>
<td>.458 (.025)</td>
<td>.455 (.025)</td>
</tr>
</tbody>
</table>

*Note. T1StrsMg = T1 stress management; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.*

In Model 2 (see Table 7.18), a significant main effect was found for Group (Est. = .059, SE = .029). The positive direction of the slope illustrates that participants in the experimental group reported better stress management scores than participants in the control group, after the effects of T1 scores had been controlled. Hence, this finding suggests that there was a significant effect of the intervention on stress management across T2 and T3. Furthermore, the interaction between Group and Time (Est. = .017, SE = .018) was not significant, demonstrating that effects of the intervention on stress management scores were consistent over time.
The results for Model 3 (see Table 7.18) found no significant aptitude-treatment interaction effects present for stress management. Thus, the results suggest that the positive effects of the intervention on stress management for the experimental group compared to the control group were present for students with both prior low and high stress management scores.

**Summary of Results for Resourcefulness**

The results provided some evidence that the intervention enhanced student resourcefulness. In particular, there was strong evidence to suggest that the program had a positive effect on open thinking and stress management. Across T2 and T3, students in the experimental group reported significantly higher open thinking and stress management scores than students in the control group, after the corresponding T1 scores had been controlled. Furthermore, support was found for the stability of the effects of the intervention in these areas between T2 and T3. Therefore, these findings provide support for Hypotheses 2.15 and 2.18. No aptitude-treatment interaction effects were present for open thinking and stress management, suggesting that the intervention was beneficial to students with both prior low and high scores on these scales.

The results also provided some evidence to suggest that the program had an impact on students' coping strategies. Although there was no significant impact on support seeking strategies averaged across T2 and T3, there was indication that there may have been positive benefit for students with initially low levels of support seeking but not for those with initially high levels of this attribute. The results from the aptitude-treatment interaction model showed that students in the experimental group with low T1 support seeking scores reported significantly higher support seeking scores across the post-intervention test occasions than participants in the control group. Thus, these results provide partial support for Hypothesis 2.13.

There was also evidence to suggest that the program may have had a sleeper effect on problem avoidance strategies and time efficiency. For the problem avoidance scale, experimental group scores significantly declined between T2 and T3, while control group scores remained fairly stable between these two test occasions. For the time efficiency scale, experimental group scores significantly increased from T2 to T3, whereas the control group students’ scores were fairly
consistent. Furthermore, for time efficiency, the disparity between the groups became clearly significant at T3. Therefore, these findings provide partial support for Hypotheses 2.14 and 2.17.

However, the results for problem solving and coping with change were inconsistent with Hypotheses 2.12 and 2.16, respectively, as the intervention appeared not to result in significant changes in students' problem solving and coping with change scores.
Sense of Possibility

Hypothesis 2.19: Effects on Self-Efficacy

The peer support program was predicted to have a positive effect on students’ self-efficacy scores. A summary of the results for self-efficacy is presented in Table 7.19. The results for the baseline components model (Model 1) indicated that most of the variation in self-efficacy scores was explained by differences at the individual student level ($\sigma^2_{u} = .721, SE = .048$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_{e} = .429, SE = .023$). Calculations of the intra-class correlation indicated that 61.2% of the variance was at the individual student level, 36.4% was at the test occasion level and only 2.4% was at the school level.

Table 7.19
Multilevel Models for Year 7 Students on the Self-Efficacy Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2 Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.147</td>
<td>-.150</td>
<td>-.149</td>
</tr>
<tr>
<td>T1SelfEfc</td>
<td>.559 (.029)</td>
<td>.554 (.029)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.031 (.018)</td>
<td>.033 (.018)</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>.028 (.029)</td>
<td>.028 (.029)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.056 (.018)</td>
<td>.058 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1SelfEfc X Time</td>
<td></td>
<td>-.044 (.018)</td>
<td></td>
</tr>
<tr>
<td>T1SelfEfc X Group</td>
<td>-.008 (.029)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SelfEfc X Group X Time</td>
<td>-.029 (.018)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{u}$: between school variance</td>
<td>.028 (.025)</td>
<td>.017 (.016)</td>
<td>.017 (.016)</td>
</tr>
<tr>
<td>$\sigma^2_{e}$: between student variance</td>
<td>.721 (.048)</td>
<td>.415 (.035)</td>
<td>.422 (.035)</td>
</tr>
<tr>
<td>$\sigma^2_{v}$: between test occasion variance</td>
<td>.429 (.023)</td>
<td>.422 (.023)</td>
<td>.415 (.023)</td>
</tr>
</tbody>
</table>

Note. T1SelfEfc = T1 self-efficacy; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
In Model 2, there was no significant main effect for Group (Est. = .028, SE = .029). However, the Group by Time interaction was significant (Est. = .056, SE = .018). The graph of this interaction (see Figure 7.18) demonstrates that students in the experimental group reported a sharp increase in self-efficacy for T2 to T3, while the control group reported a clear decline between these two test occasions.

Further analyses were conducted to test the self-efficacy results separately for the experimental and control groups over T2 to T3 (see Appendix F-3). These results found that scores for the experimental group increased significantly from T2 to T3 (Est. = .090, SE = .028), while scores for the control group did not differ significantly over these two test occasions (Est. = -.024, SE = .022). Additional analyses were also conducted to test the self-efficacy results separately at T2 and T3 (see Appendix F-4). These results revealed that, while no significant differences were present between the experimental and control group at T2 (Est. = -.037, SE = .038), the disparity between the groups became noticeably significant by T3 (Est. = .082, SE = .038). Thus, these results provide clear evidence to suggest that the program may have had a sleeper effect on self-efficacy scores at T3, thereby providing partial support for Hypothesis 2.19. The results for Model 3 (see Table 7.19) showed that there were no significant aptitude-treatment interaction effects present for the self-efficacy scale.
Figure 7.18. Change in post-intervention self-efficacy scores (SfEfc) for the experimental and control groups across T2 and T3. Post-intervention SfEfc scores were standardised in terms of the mean and SD of T1 scores.
Effects on Remaining Outcomes

The effects of the program on all other variables not explicitly predicted to be effected by the intervention were also examined through multilevel procedures. A summary of the results for these variables is presented in Table 7.20 (More comprehensive results can be found in Appendix F-3).

The results of the baseline model (Model 1) for each of these variables indicates that most of the variance could be explained by differences at the individual student level. A considerable portion of the variance could also be explained by differences between test occasions. The variance between individual students and test occasions was significant for all variables. However, there was very little variation between schools on any of the variables, with none of the school effects attaining significance.

In Model 2 (see Table 7.20), significant effects of Time were found on the following scales: physical appearance (Est. = .059, SE = .014), parent relations (Est. = -.049, SE = .019), math (Est. = -.028, SE = .013), active involvement (Est. = -.060, SE = .017), and parent support (Est. = -.060, SE = .020). Apart from physical appearance, the direction of the parameter estimate was negative which indicates that there was a significance decline in parent relation, math, active involvement and parent support scores over time (i.e., between T2 and T3). On the other hand, for physical appearance, there was a significant increase in scores between T2 and T3. No significant main effects for Time were found on any of the other variables.

Model 2 shows that there were no significant main effects for Group on any of the variables. However, a significant Group by Time interaction was found for some. The first of these was located on the emotional stability scale (Est. = .039, SE = .015). The graph of this interaction (see Figure 7.19) demonstrates that for students in the experimental group there was an increase in emotional stability scores between T2 and T3, while for the control group there was a decline in scores between these two test occasions. Further analyses were carried out to test the results separately for the experimental and control groups (see Appendix F-3), which revealed that scores for the experimental group did not differ significantly from T2 to T3 (Est. = -.028, SE = .029). On the other hand, for the control group, emotional stability scores declined significantly over these two test occasions (Est. = -.079, SE = .040).
Additional analyses were also carried out to test the results separately at T2 and T3 (see Appendix F-3), which revealed, however, that the difference between the experimental and control groups was not significant at either T2 (Est. = -.028, SE = .029) or T3 (Est. = .039, SE = .033).

The results for emotional stability also indicated the presence of an aptitude-treatment interaction effect, with the T1EmtStb x Group interaction just reaching significance (Est. = -.057, SE = .027). The graph of this interaction (see Figure 7.20) illustrates a cross-over or antagonistic effect (McBurney, 1994), which consequently explains the non-significant effect of Group reported in Model 2 for this scale. Figure 7.20 shows that the experimental group students with low pre-test scores reported higher emotional stability scores across T2 and T3 than control group students with low pre-test scores. Conversely, for students with high pre-test scores, the experimental group reported marginally lower emotional stability scores across T2 and T3 than the control group. Thus, the intervention had a somewhat larger positive effect for students with low T1 scores and a somewhat smaller negative effect for students with high T1 scores.

![Graph showing change in emotional stability scores over time](image)

*Figure 7.19.* Change in post intervention emotional stability scores (EmtStb) for the experimental and control groups across T2 and T3. Post-intervention EmtStb scores were standardised in terms of the mean and SD of T1 scores.
For the active involvement scale, while there was no significant main effect of Group, the Group by Time interaction was significant (Est. = .038, SE = .017). The graph of this interaction (see Figure 7.21) shows that scores for the experimental group were fairly stable between T2 and T3, whereas scores for the control group clearly declined between these two test occasions. Consistent with Figure 7.21, further tests revealed that scores for the control group declined significantly from T2 to T3 (Est. = -.097, SE = .024), while scores for the experimental group did not differ significantly over these two test occasions (Est. = -.022, SE = .025). However, additional tests revealed that the differences between the experimental and control groups on this scale (see Appendix F:3) were not significant at either T2 (Est. = -.026, SE = .037) or T3 (Est. = .065, SE = .039).

![Graph](image)

*Figure 7.20.* Relationship between post-intervention emotional stability scores (EmtStb) and corresponding T1 scores (T1EmtStb) for the experimental and control groups. Post-intervention EmtStb scores were standardised in terms of the mean and SD of T1 scores.
Figure 7.21. Change in post-intervention active involvement scores (Actinv) for the experimental and control groups across T2 and T3. Post-intervention Actinv scores were standardised in terms of the mean and SD of T1 scores.

For the enjoyment of school scale, there was no significant main effect for Group (Est. = .075; SE = .045). However, a significant Group by Time interaction was found on this scale (Est. = .034, SE = .015). The graph of this interaction (see figure 7.22) shows that enjoyment of school scores for the experimental group noticeably increased between T2 and T3, whereas scores in this domain for the control group were fairly stable over time.

Further analyses were conducted to test the enjoyment of school results separately for the experimental and control groups across T2 and T3 (see Appendix F-3). Consistent with Figure 7.22, these results demonstrated that the experimental group reported increases in enjoyment of school from T2 to T3, however, these differences were not significant (Est. = .033, SE = .023). Furthermore, the control group scores declined, but not significantly, over these two test occasions (Est. = -.028, SE = .020). Hence, whereas the decline for the control group was significantly different from the increase for the experimental group (as demonstrated by the significant group x time interaction), the effect of time was not statistically significant for either group considered separately. However, additional analyses indicated that, while the differences between the experimental and control groups
were not significant at T2 (Est. = .026, SE = .031), they were clearly significant by T3 (Est. = .125, SE = .035) (see Appendix F-4).

![Graph](image)

**Figure 7.22.** Change in post-intervention enjoyment of school scores (EnjSch) for the experimental and control groups across T2 and T3. Post-intervention Enjscj scores were standardised in terms of the mean and SD of T1 scores.

**Summary of Results for Remaining Outcome Variables**

In summary, the results suggested that the intervention had no significant immediate impact on any of the outcome measures examined in this section. However, for a number of outcomes the results were indicative of a sleeper effect. The first of these was emotional stability, with the results demonstrating that control group scores on this scale significantly decreased from T2 to T3, while scores for the experimental group were fairly consistent over this time. Then again, the differences between the experimental and control groups were not significant at either T2 or T3. Further analysis suggested that students with lower prior emotional stability scores may have especially benefited from participation in the intervention.

Similarly, the results for active involvement showed that control group scores significant declined from T2 to T3, whereas the experimental group students’ scores
were fairly consistent across these test occasions. Again, however, the difference between the experimental and control groups was not significant at either T2 or T3.

The results also showed that enjoyment of school scores for the experimental group increased between T2 and T3, whereas scores for the control group were fairly stable between these test occasions. Furthermore, additional analyses demonstrated that, while the differences between the experimental and control groups were not significant at T2, they were noticeably significant by T3.
Table 7.20 Multilevel Models for Year 7 Students on the Remaining Outcome Variables

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Physical Ability</th>
<th>Physical Appearance</th>
<th>Parent Relations</th>
<th>Emotional Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.055</td>
<td>-.053</td>
<td>-.055</td>
<td>.042</td>
</tr>
<tr>
<td>T1Variable</td>
<td>.663 (.024)</td>
<td>.665 (.024)</td>
<td>.586 (.027)</td>
<td>.583 (.027)</td>
</tr>
<tr>
<td>Time</td>
<td>-.014 (.015)</td>
<td>-.013 (.014)</td>
<td>.059 (.014)</td>
<td>.061 (.014)</td>
</tr>
<tr>
<td>Group</td>
<td>.032 (.024)</td>
<td>.031 (.024)</td>
<td>.037 (.027)</td>
<td>.039 (.027)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.029 (.015)</td>
<td>.028 (.015)</td>
<td>-.018 (.015)</td>
<td>-.012 (.014)</td>
</tr>
<tr>
<td>T1Variable X Time</td>
<td>-.018 (.015)</td>
<td>-.058 (.014)</td>
<td>-.001 (.019)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group</td>
<td>-.034 (.024)</td>
<td>-.067 (.027)</td>
<td>-.088 (.034)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group X Time</td>
<td>.023 (.015)</td>
<td>.006 (.014)</td>
<td>.013 (.019)</td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.045 (.039)</td>
</tr>
<tr>
<td>$\sigma^2_s$: between student variance</td>
<td>.750 (.044)</td>
<td>.305 (.025)</td>
<td>.306 (.025)</td>
<td>.747 (.045)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td>.276 (.015)</td>
<td>.285 (.016)</td>
<td>.282 (.016)</td>
<td>.284 (.015)</td>
</tr>
</tbody>
</table>

Note. T1 Variable = corresponding T1 variable; Time = test occasion (T2 and T3); Group = test condition (experimental and control); Positive values indicate higher values for the experimental group; Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
Table 7.20 continued

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Math</th>
<th>Social Effectiveness</th>
<th>Leadership Ability</th>
<th>Quality Seeking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 Est.</td>
<td>Model 2 Est.</td>
<td>Model 3 Est.</td>
<td>Model 1 Est.</td>
</tr>
<tr>
<td></td>
<td>Model 2 Est.</td>
<td>Model 3 Est.</td>
<td>Model 2 Est.</td>
<td>Model 3 Est.</td>
</tr>
<tr>
<td></td>
<td>Model 1 Est.</td>
<td>Model 2 Est.</td>
<td>Model 3 Est.</td>
<td>Model 1 Est.</td>
</tr>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.067</td>
<td>-.057</td>
<td>-.057</td>
<td>-.060</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable</td>
<td>.717 (.025)</td>
<td>.715 (.025)</td>
<td>.547 (.030)</td>
<td>.545 (.030)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.530 (.028)</td>
<td>.529 (.029)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.556 (.033)</td>
<td>.558 (.033)</td>
</tr>
<tr>
<td>Time</td>
<td>-.028 (.013)</td>
<td>-.028 (.013)</td>
<td>.006 (.017)</td>
<td>.004 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.014 (.017)</td>
<td>-.014 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.049 (.019)</td>
<td>-.050 (.019)</td>
</tr>
<tr>
<td>Group</td>
<td>-.013 (.025)</td>
<td>-.013 (.025)</td>
<td>.026 (.030)</td>
<td>.025 (.030)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.054 (.029)</td>
<td>.055 (.029)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.012 (.032)</td>
<td>.012 (.032)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.001 (.013)</td>
<td>.001 (.013)</td>
<td>.017 (.017)</td>
<td>.016 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.017 (.017)</td>
<td>.017 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.037 (.019)</td>
<td>.037 (.019)</td>
</tr>
<tr>
<td>T1Variable X Time</td>
<td>-.016 (.013)</td>
<td>-.019 (.017)</td>
<td>-.020 (.017)</td>
<td>-.020 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-.003 (.019)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group</td>
<td>.006 (.025)</td>
<td>.076 (.030)</td>
<td>-.017 (.029)</td>
<td>-.017 (.029)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.19 (.033)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group X Time</td>
<td>-.016 (.013)</td>
<td>.031 (.017)</td>
<td>-.015 (.017)</td>
<td>-.015 (.017)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.009 (.019)</td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\text{between school variance}}$</td>
<td>.023 (.022)</td>
<td>.013 (.012)</td>
<td>.013 (.012)</td>
<td>.009 (.010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.005 (.006)</td>
<td>.006 (.007)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.007 (.007)</td>
<td>.006 (.007)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.028 (.026)</td>
<td>.022 (.020)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{between student variance}}$</td>
<td>.911 (.050)</td>
<td>.394 (.027)</td>
<td>.394 (.027)</td>
<td>.787 (.050)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.500 (.038)</td>
<td>.496 (.037)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.738 (.048)</td>
<td>.426 (.035)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.430 (.035)</td>
<td>.849 (.056)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.572 (.045)</td>
<td>.571 (.045)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{between test occasion variance}}$</td>
<td>.217 (.012)</td>
<td>.214 (.012)</td>
<td>.213 (.012)</td>
<td>.391 (.021)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.376 (.021)</td>
<td>.374 (.021)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.390 (.021)</td>
<td>.393 (.022)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.390 (.022)</td>
<td>.491 (.026)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.472 (.026)</td>
<td>.473 (.026)</td>
</tr>
</tbody>
</table>

Note. T1Variable = corresponding T1 variable; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.
Table 7.20 continued

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Active Involvement</th>
<th>Overall Effectiveness</th>
<th>Parent Support</th>
<th>Enjoyment of School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.147</td>
<td>-.158</td>
<td>-.157</td>
<td>-.116</td>
</tr>
<tr>
<td>T1Variable</td>
<td>.596 (.028)</td>
<td>.587 (.028)</td>
<td>.527 (.030)</td>
<td>.521 (.031)</td>
</tr>
<tr>
<td>Time</td>
<td>-.060 (.017)</td>
<td>-.059 (.017)</td>
<td>.022 (.017)</td>
<td>.025 (.017)</td>
</tr>
<tr>
<td>Group</td>
<td>.000 (.028)</td>
<td>.002 (.028)</td>
<td>.034 (.031)</td>
<td>.035 (.031)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group X Time</td>
<td>.038 (.017)</td>
<td>.038 (.017)</td>
<td>.015 (.017)</td>
<td>.019 (.017)</td>
</tr>
<tr>
<td>T1Variable X Time</td>
<td>-.027 (.017)</td>
<td></td>
<td>-.056 (.017)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group</td>
<td>.021 (.028)</td>
<td>.031 (.031)</td>
<td>-.019 (.036)</td>
<td></td>
</tr>
<tr>
<td>T1Variable X Group X Time</td>
<td>-.033 (.017)</td>
<td></td>
<td>-.038 (.018)</td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_c$: between school variance</td>
<td>.002 (.005)</td>
<td>.003 (.005)</td>
<td>.003 (.005)</td>
<td>.007 (.009)</td>
</tr>
<tr>
<td>$\sigma^2_w$: between student variance</td>
<td>.722 (.048)</td>
<td>.401 (.034)</td>
<td>.406 (.034)</td>
<td>.789 (.050)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td>.415 (.022)</td>
<td>.400 (.022)</td>
<td>.394 (.022)</td>
<td>.402 (.022)</td>
</tr>
</tbody>
</table>

*Note. T1Variable = corresponding T1 variable; Time = test occasion (T2 and T3); Group = test condition (experimental and control; Positive values indicate higher values for the experimental group); Est. = parameter estimate. Standard errors are given in parentheses. Values in bold are statistically significant.*
Effects at the Peer Support Group Level

The use of multilevel modelling for the present study also opened up the opportunity to examine whether the effects of the program varied from one peer support group to another. This is potentially important in terms of evaluating whether the effects generalise across different groups and, perhaps, provide an indication as to whether there are differences in the quality of implementation. A baseline variance components model (see Chapter 5) was used to evaluate how much variation in each of the outcome measures, averaged across T2 and T3, was due to differences in the 45 peer support groups. These analyses included the experimental group data only (because control groups were not assigned to groups) and began with a four-level model, consisting of school at the fourth level, peer support group at the third level, individual student at the second level, and test occasion at the first level. However, for a number of the dependent variables, the inclusion of four levels in the model meant that some of the computations did not converge. According to Hox (1995), non-convergence often occurs when one tries to estimate too many random (variance) components that are actually close or equal to zero. To rectify the problem, the model was simplified by removing the fourth level. Consequently, variance components were estimated for peer support groups, individual students, and test occasions. A summary of the results for each of the outcome measures is presented in Table 7.21 (More comprehensive results can be found in Appendix F-5).

The results illustrate that the peer group variance was small for each of the outcome measures, indicating that there was little variation from one peer support group to another. On average, the peer group variance made up a proportion of only .021 (i.e., 2.1%) of the total variance (range = .00 to .06). None of the variance components at the peer group level reached significance. The absence of significant variance at this level indicates that the effects of the program did not vary across the 45 peer support groups.

Most of the variance in the outcome measures appeared to be at the individual student level. On average, the individual student variance made up a proportion of .661 (i.e., 66.1%) of the total variance (range = .46 to .82). A considerable portion of variation in the scales could also be explained at the test occasion level. On average, variation at the test occasion level made up a proportion of .318 (i.e., 31.8%) of the
The total variance (range = .18 to .52). Each individual student and test occasion variance component was significant, because the corresponding ratio of the parameter estimate to its standard error was greater than 1.96 for each of the outcome measures.

Table 7.21 Variance Components Models with Peer Support Group as a Level

<table>
<thead>
<tr>
<th>Scale</th>
<th>Between peer group variance ($\sigma^2_g$)</th>
<th>Between student variance ($\sigma^2_u$)</th>
<th>Between test occasion variance ($\sigma^2_e$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Est. $\rho$</td>
<td>Est. $\rho$</td>
<td>Est. $\rho$</td>
</tr>
<tr>
<td><strong>SDQII-S</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>.026 (.027) .025</td>
<td>.738 (.067) .714</td>
<td>.270 (.022) .261</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>.051 (.032) .049</td>
<td>.749 (.066) .723</td>
<td>.236 (.019) .228</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>.000 (.000) .000</td>
<td>.650 (.063) .641</td>
<td>.364 (.029) .359</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>.000 (.000) .000</td>
<td>.632 (.057) .698</td>
<td>.273 (.022) .302</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>.000 (.000) .000</td>
<td>.901 (.078) .730</td>
<td>.333 (.027) .270</td>
</tr>
<tr>
<td>Parent Relations</td>
<td>.055 (.040) .039</td>
<td>.988 (.091) .697</td>
<td>.375 (.030) .264</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>.019 (.027) .017</td>
<td>.779 (.074) .689</td>
<td>.333 (.027) .294</td>
</tr>
<tr>
<td>Verbal</td>
<td>.048 (.031) .047</td>
<td>.690 (.064) .675</td>
<td>.284 (.021) .278</td>
</tr>
<tr>
<td>Math</td>
<td>.000 (.000) .000</td>
<td>.980 (.078) .818</td>
<td>.218 (.018) .182</td>
</tr>
<tr>
<td>General School</td>
<td>.038 (.033) .033</td>
<td>.835 (.077) .727</td>
<td>.276 (.028) .240</td>
</tr>
<tr>
<td>Global Self Esteem</td>
<td>.041 (.036) .032</td>
<td>.970 (.084) .751</td>
<td>.280 (.023) .217</td>
</tr>
<tr>
<td><strong>ROPE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>.056 (.037) .044</td>
<td>.847 (.080) .667</td>
<td>.366 (.029) .289</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>.032 (.029) .027</td>
<td>.637 (.072) .547</td>
<td>.496 (.039) .426</td>
</tr>
<tr>
<td>Stress Management</td>
<td>.020 (.027) .017</td>
<td>.691 (.074) .586</td>
<td>.468 (.037) .397</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>.039 (.032) .033</td>
<td>.790 (.075) .675</td>
<td>.342 (.027) .292</td>
</tr>
<tr>
<td>Social Efficacy</td>
<td>.012 (.027) .010</td>
<td>.829 (.077) .707</td>
<td>.332 (.026) .283</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td>.031 (.031) .026</td>
<td>.841 (.078) .701</td>
<td>.327 (.026) .273</td>
</tr>
<tr>
<td>Leadership Ability</td>
<td>.000 (.000) .000</td>
<td>.652 (.067) .594</td>
<td>.446 (.036) .406</td>
</tr>
<tr>
<td>Time Efficiency</td>
<td>.039 (.029) .035</td>
<td>.638 (.068) .579</td>
<td>.426 (.034) .386</td>
</tr>
<tr>
<td>Quality Seeking</td>
<td>.024 (.032) .018</td>
<td>.856 (.085) .643</td>
<td>.451 (.036) .339</td>
</tr>
<tr>
<td>Coping with Change</td>
<td>.075 (.040) .059</td>
<td>.784 (.078) .620</td>
<td>.405 (.032) .321</td>
</tr>
<tr>
<td>Active Involvement</td>
<td>.015 (.029) .012</td>
<td>.847 (.081) .681</td>
<td>.382 (.031) .307</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td>.010 (.029) .008</td>
<td>.858 (.084) .661</td>
<td>.431 (.034) .331</td>
</tr>
<tr>
<td><strong>CSI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>.008 (.025) .007</td>
<td>.711 (.074) .648</td>
<td>.379 (.032) .345</td>
</tr>
<tr>
<td>Seeking Support</td>
<td>.000 (.020) .000</td>
<td>.580 (.063) .619</td>
<td>.357 (.030) .381</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.020 (.025) .020</td>
<td>.617 (.065) .624</td>
<td>.352 (.030) .356</td>
</tr>
<tr>
<td>APRI-A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully</td>
<td>.002 (.025) .002</td>
<td>.674 (.076) .601</td>
<td>.445 (.038) .397</td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>.011 (.021) .012</td>
<td>.435 (.061) .464</td>
<td>.491 (.042) .524</td>
</tr>
<tr>
<td><strong>Support Scales</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent Support</td>
<td>.056 (.045) .035</td>
<td>1.126 (.103) .707</td>
<td>.410 (.033) .258</td>
</tr>
<tr>
<td>Peer Support</td>
<td>.000 (.000) .000</td>
<td>.723 (.075) .595</td>
<td>.492 (.040) .405</td>
</tr>
<tr>
<td>Enjoy School Scale</td>
<td>.043 (.034) .035</td>
<td>.884 (.080) .708</td>
<td>.321 (.025) .257</td>
</tr>
</tbody>
</table>

*Note.* Est. = parameter estimate, $\rho$ = proportion of total variance. Standard errors are given in parentheses. Values in bold are statistically significant.
Summary

The current chapter has provided a comprehensive evaluation of the effects of the peer support program for Year 7 students. A strong design was employed in which the impact of the intervention on school self-concept, school citizenship, general sense of self, connectedness, resourcefulness, sense of possibility, and other important psychological outcomes were evaluated with a sample of 930 Year 7 students from three secondary schools. Experimental and control group participants were tested on three occasions: prior to the commencement of the program, at the completion of the program and again, four months later. The study utilised measurement instruments with strong psychometric properties (see Chapter 6), as well as highly advanced statistical analyses to evaluate students’ responses (see Chapter 5).

The results clearly demonstrated that the peer support program had a positive impact on school self-concept. Consistent with predictions, students in the experimental group reported higher general school and verbal self-concepts over the two post-intervention test occasions than the control group. Strong evidence was also found for the maintenance of the intervention’s effects in these domains over time. Further tests also indicated that students with lower prior levels of general school self-concept especially benefited from the intervention.

The findings for school citizenship were also very strong. In accordance with predictions, students in the experimental group reported lower pro-bully scores and higher honesty/trustworthiness scores averaged across the two post-intervention test occasions than the control group. Moreover, clear evidence was found for the stability of these effects over time. The results also suggested that the program may have had a sleeper effect on pro-victim attitudes, particularly for those with prior low levels in this domain.

The results provided partial support for the capacity of the intervention to enhance connectedness. Although the program did not appear to have had a significant impact on same-sex relations self-concept, strong evidence was found for opposite-sex relations self-concept. Across the two post-intervention test occasions, students in the experimental group reported significantly higher opposite-sex relations self-concept scores than the control group. Support was also found for the
maintenance of the effects on opposite-sex relations self-concept over time. There was also some indication that the intervention may have had a sleeper effect on cooperative teamwork and peer support scores. For cooperative teamwork, the results showed that students’ scores in the experimental group were stable from T2 to T3, while the control group reported significant declines in cooperative teamwork between these two test occasions. Similarly, the results for peer support indicated that students’ scores in the experimental group increased from T2 to T3, while the control group reported declines in peer support between these two test occasions.

Consistent with predictions, the program also appeared to have a positive impact on certain aspects of resourcefulness, particularly for open thinking and stress management. Across the two post-intervention test occasions, students in the experimental group reported significantly higher open thinking and stress management scores than the control group. Furthermore, support was found for the stability of the effects of the intervention in these domains over time. There was also evidence to suggest that the program may have had a positive sleeper effect on time efficiency and problem avoidance, with the experimental group exhibiting significantly enhanced scores in these domains and the control group scores being relatively stable between T2 and T3.

For some, the program also appeared to have an impact on support seeking strategies. The results indicated that that the intervention had a positive effect in this domain for students with initially low levels of support seeking but not for those with initially high levels of support seeking. Contrary to expectations, however, the intervention did not result in significant changes in students’ utilisation of problem solving strategies and ability to cope with change.

The results provided partial support for the capacity of the intervention to enhance student’s sense of possibility. Although the program did not have an immediate effect on self-efficacy scores at T2, there was good evidence to suggest that the program had a positive sleeper effect on self-efficacy scores at T3. The results showed that students in the experimental group reported a significant increase in self-efficacy from T2 to T3 while the control group scores were relatively stable between these two test occasions. Furthermore, the disparity between the experimental and control groups became noticeably significant by T3.
The results provided some evidence that the intervention enhanced students’ self-confidence. Although there was no significant impact on self-confidence averaged across T2 and T3, the results were suggestive of a sleeper effect on self-confidence scores at T3. The results showed that students in the control group reported significant decreases in self-confidence from T2 to T3, while the experimental group scores were fairly stable between these two test occasions. However, the intervention did not appear to provide significant changes in students’ global self-esteem scores.

Results on additional psychological outcomes also suggested that the program may have had a delayed positive effect on emotional stability, active involvement and enjoyment of school scores. Control group scores on the emotional stability and active involvement scales significantly declined from T2 to T3, whereas the experimental group students’ scores were fairly consistent across these test occasions. For the enjoyment of school scale, scores for the experimental group increased between T2 and T3, while scores for the control group were fairly stable between these test occasions. Furthermore, for the enjoyment of school scale, the experimental group reported significantly higher scores than the control group at T3.

The results from baseline variance models were important in determining whether the effects of the program varied from school to school or from one peer support group to another. The results from these analyses clearly demonstrated that there was little variance at either the school level or peer support group level. Therefore, the absence of significant variance at these levels demonstrated that the effects of the program did not vary across the three participating schools and 45 peer support groups within these three schools.

In summary, the results of Study 2 demonstrate that the intervention was largely successful in achieving its goals of enhancing Year 7 students’ school self-concept, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility for the future. Furthermore, the program appears to have had a delayed positive effect on a number of other desirable outcomes, including emotional stability, active involvement and enjoyment of school scores. Thus, these findings of this study provide good evidence to suggest that the peer support program can make a significant contribution to schools’ efforts to produce positive outcomes for Year 7 students.
CHAPTER 8

STUDY 3 RESULTS: EFFECTS OF THE INTERVENTION ON PEER SUPPORT LEADERS

Introduction

In the majority of literature on peer support initiatives, the impact of the program on the participants is of primary concern, with the impact on the helpers or leaders often being ignored. Although some have speculated on the potential benefits of serving as a peer support leader, very little empirical research has been conducted in this area (see Chapter 2). Study 3 was specifically designed to address this issue and advance current research by exploring the effects of a peer support program on the peer leaders themselves.

The results in this chapter are based on the methodology employed in Study 3 where peer support leaders and two comparison groups completed questionnaires on three separate occasions. The data for this study was collected over a two year period. Year 10/11 students who completed questionnaires in the first year of the study (2001) formed control group 1 (C1). On the other hand, Year 10/11 in 2002 who served as peer support leaders constituted the experimental group, while those who were not involved in the program in 2002 formed control group 2 (C2). A total of 858 Grade 10/11 students participated in this study (See Chapter 5 for further details on the methodology for Study 3).

In this chapter, multilevel modelling procedures were used to compare the effects of the experimental group with those of the control groups. Orthogonal contrasts were formed to test for differences between the three groups. The a priori hypotheses and research questions presented in Chapter 4 were used as an advanced organiser for the analyses pursued.

Overview of Statistical Analyses

For the present study, the peer support program was hypothesised to have a positive and sustained impact on leadership ability for peer group leaders. The effects of the intervention on various other psychological outcome measures, which included measures of self-concept, life effectiveness, coping strategies, perceptions of
bullying, social support and enjoyment of school, were also explored in the current study. Data for this study was collected on three separate occasions: Before the commencement of the program (T1), at the completion of the program (T2) and again, four months later (T3).

In this chapter, multilevel modelling procedures were used to examine the effects of the intervention (see Chapter 5 for a detailed discussion on multilevel modelling procedures). Analyses consisted of a three-level model, with time at the first level, individual student at the second level, and school at the third level. The data was arranged so that the two post-intervention test occasions (T2 and T3) were specified at the first level and T1 measures were treated as covariates in models examining the effects of the program (see Marsh, Hau, & Kong, 2002, for a rationale for the use of this conditional multilevel covariance approach). Three sets of contrasts were employed to test for differences between the participating groups and the stability of effects between T2 and T3 (see Chapter 5 for a detailed description on the contrasts applied in this study). Study 3 was also designed to test for the presence of aptitude-treatment interaction effects. The aim was to assess whether students with lower pre-intervention scores benefited more from serving as peer support leaders than students who scored at or above the normal range (see Chapter 4). For further details on the statistical techniques applied in this chapter, see Chapter 5.

**Preliminary Analyses**

Raw group means and standard deviations for the experimental and control groups at the three data collection points are presented in Appendix G-1. The experimental and control groups were initially examined for pre-existing differences in T1 scores. Analyses were conducted using multilevel modelling procedures, with T1 outcome measures serving as the dependent variables. A two-level model was specified with individual student at the first level and school at the second level. Contrast variables were added to the baseline variance components model to test for differences between the three participating groups. The first contrast tested whether the control groups significantly differed from one another (c1 - c2) and the second, tested whether the experimental group differed significantly from the average of the control groups [exp - (mean c1 and c2)]. The coefficients formulated for the contrasts
are presented in Table 8.1. This contrast set can be considered to be orthogonal because the cross-product of their coefficients sums to zero (Rosenthal et al., 2000).

Table 8.1

*Contrasts used in preliminary analyses*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast 1: $c_2 - c_1$</td>
<td>0</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Contrast 2: $\exp - (\text{mean } c_1 \text{ and } c_2)$</td>
<td>2</td>
<td>-1</td>
<td>-1</td>
</tr>
</tbody>
</table>

The results from analyses testing for group differences in T1 scale scores are presented in Table 8.2. The results for Contrast 1 found significant effects for only three of the outcome measures. In each of these instances, the direction of the parameter estimate was negative which illustrates that 2002 control group participants (i.e., control group 2) reported lower verbal self-concept, open thinking and problem avoidance scores than 2001 control group participants (i.e., control group 1). It was unsurprising that some pre-test differences were found as the 2001 control group was based on an entire year cohort while the 2002 control group incorporated students from the year group who were not selected as peer support leaders. Nevertheless, pre-test differences between the two control groups were generally small and—despite the large sample sizes—were statistically significant for only 3 of the 31 outcomes considered.

Alternatively, significant effects for Contrast 2 were found on 25 of the 31 outcome measures (see Table 8.3), indicating that the experimental group differed significantly from the control groups on 76% of the outcome measures tested. For the vast majority of scales where significant differences were found, the direction of the parameter estimate was positive, demonstrating that participants in the experimental group scored significantly higher than participants in the control groups for 23 of the measured scales. On the other hand, for the problem avoidance and pro-bully scales the parameter estimate was negative, indicating that participants in the experimental group scored significantly lower on these two scales than the control groups. In contrast to the other outcome measures, lower scores on the problem avoidance and pro-bully scales are considered to be more desirable than higher scores on these
scales. Consequently, the results show that experimental group students exhibited superior scores than the control groups on each of the 25 where significant differences were found.

Considering that the peer support leaders were selected specifically for their role, it was no surprise that significant effects were found for Contrast 2. Indeed the Peer Support Foundation recommends that leader selection should be based on the efficacy of students’ social skills, leadership ability and contribution to the school community (see Chapter 3). Thus, superior scores for the peer support leaders on a number of the outcome measures were to be expected. However, the non-equivalence of T1 scale scores between the experimental and control groups is a weakness of the present study and one that must be kept in mind when examining the results. This issue will be discussed further in Chapter 10.

Table 8.2

Results for Contrasts used to Test for Differences between the Groups at T1

<table>
<thead>
<tr>
<th>Scale</th>
<th>C1 Est.</th>
<th>C2 Est.</th>
<th>Scale</th>
<th>C1 Est.</th>
<th>C2 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDQII-S</td>
<td></td>
<td></td>
<td>ROPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>.046 (.027)</td>
<td>-.024 (.028)</td>
<td>Self-Confidence</td>
<td>.065 (.026)</td>
<td>.011 (.028)</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>.048 (.026)</td>
<td>.031 (.027)</td>
<td>Self-Efficacy</td>
<td>.009 (.027)</td>
<td>-.005 (.028)</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>.063 (.027)</td>
<td>-.005 (.028)</td>
<td>Stress Management</td>
<td>.114 (.026)</td>
<td>-.002 (.028)</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>.071 (.027)</td>
<td>.012 (.028)</td>
<td>Open Thinking</td>
<td>.104 (.026)</td>
<td>-.060 (.028)</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>.072 (.026)</td>
<td>.026 (.028)</td>
<td>Social Efficacy</td>
<td>.162 (.026)</td>
<td>.026 (.028)</td>
</tr>
<tr>
<td>Parent Relations</td>
<td>.053 (.026)</td>
<td>.053 (.028)</td>
<td>Cooperative Teamwork</td>
<td>.101 (.026)</td>
<td>.014 (.028)</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>.028 (.027)</td>
<td>.009 (.028)</td>
<td>Leadership Ability</td>
<td>.165 (.026)</td>
<td>-.045 (.028)</td>
</tr>
<tr>
<td>Verbal</td>
<td>.086 (.026)</td>
<td>-.090 (.027)</td>
<td>Time Efficiency</td>
<td>.074 (.026)</td>
<td>.011 (.028)</td>
</tr>
<tr>
<td>Math</td>
<td>.089 (.026)</td>
<td>-.035 (.028)</td>
<td>Quality Seeking</td>
<td>.040 (.026)</td>
<td>-.024 (.028)</td>
</tr>
<tr>
<td>Global School</td>
<td>.157 (.026)</td>
<td>-.045 (.028)</td>
<td>Coping with Change</td>
<td>.097 (.026)</td>
<td>.006 (.028)</td>
</tr>
<tr>
<td>Global Self-Esteem</td>
<td>.114 (.027)</td>
<td>.002 (.028)</td>
<td>Active Involvement</td>
<td>.106 (.026)</td>
<td>-.024 (.028)</td>
</tr>
<tr>
<td>CSI</td>
<td>.120 (.026)</td>
<td>.023 (.028)</td>
<td>Overall Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>.075 (.027)</td>
<td>-.026 (.029)</td>
<td>APRI-A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support Seeking</td>
<td>.102 (.026)</td>
<td>-.027 (.025)</td>
<td>Pro-Bully</td>
<td>-.146 (.026)</td>
<td>.049 (.028)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>-.078 (.027)</td>
<td>-.077 (.028)</td>
<td>Pro-Victim</td>
<td>.138 (.026)</td>
<td>-.029 (.028)</td>
</tr>
<tr>
<td>PAS</td>
<td>.094 (.026)</td>
<td>.017 (.028)</td>
<td>Enjoyment of School</td>
<td>.166 (.026)</td>
<td>-.046 (.028)</td>
</tr>
<tr>
<td>Parent Support</td>
<td>.050 (.026)</td>
<td>.008 (.028)</td>
<td>Peer Support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note. Est. = Parameter estimate (C1 Est.: Positive values indicate higher values for the experimental group; C2 Est.: Positive values indicate higher values for control group 2). Standard errors are given in parentheses. All T1 variables were standardised to have a mean = 0 & SD = 1. Values in bold are statistically significant.

Effects of the Intervention on Leadership Ability

Hypothesis 3.1: Leadership Ability

For Study 3, it was hypothesised that participants in the experimental group would report higher leadership ability scores than students in the control groups and that these gains would be maintained over time. As this is the first outcome in this chapter for which the results are being reviewed, a detailed description of the statistical analyses and methods of interpretation have been presented. The methods described for leadership ability have been employed for the remainder of the outcomes examined in this chapter.

Three key models were used to compare the leadership ability scores of students in the experimental group with those of the control groups. Model 1 was a baseline variance components model that was used to determine how much of the total variance was partitioned into variance components associated with school, individual and time. The baseline model for leadership ability (lead) is presented in Figure 8.1. The mean intercept, $\beta_0$, constituting the fixed part of the model, is .048 with a standard error of .056. The intercepts for the different schools (level 3 residuals, $\upsilon_{0jk}$) have a variance, $\sigma^2_{\upsilon_0}$, of .006 (standard error = .008) indicating that the intercepts of the three different schools do not differ from one another. On the other hand, the level 2 residuals, $\sigma^2_{\upsilon_0}$, have a variance of .488 with a standard error of .039. This parameter estimate is large, demonstrating that most of the variation in leadership ability could be explained by differences at the individual level. The level 1 residuals, $e_{ijk}$, indicate a considerable portion of the variation in leadership ability could also be explained by differences at the test occasion level ($\sigma^2_{e0} = .308$; standard error = .021). Using the Wald statistic, the variation at the individual student and test occasion level are significant as the ratio of the parameter estimate to its standard error is clearly greater than 1.96.

The variance components shown in Figure 8.1 were also used to compute the intra-class correlation. The total variance in general school self-concept is the sum of
the level 3, level 2 and level 1 variances (.006+.488+.308=.802). The results indicate that 60.8% of the variance was at the individual level, 38.4% was at the test occasion level and 8% was at the school level.

\[
\begin{align*}
\text{lead}_{yk} & \sim N(\Delta B, \Omega) \\
\text{lead}_{yk} & = \beta_{0yk} + \text{cons} \\
\beta_{0yk} & = 0.048(0.056) + \nu_{yk} + \mu_{0yk} + e_{0yk} \\
\begin{bmatrix}
\nu_{yk} \\
\mu_{0yk} \\
e_{0yk}
\end{bmatrix} & \sim N(0, \Omega_v):
\Omega_v = \begin{bmatrix}
0.006(0.008) \\
0.488(0.039) \\
0.308(0.021)
\end{bmatrix}
\end{align*}
\]

*Figure 8.1.* Model 1: Baseline variance components model for leadership ability (lead). In the model, leadijk is the outcome measure for individual j of the kth school at time i. \(\Delta B\) = fixed part of the model; \(\Omega\) = covariance matrix; \(\beta_{0yk}\) = intercept; \(\nu_{yk}\) = random school effect; \(u_{0yk}\) = random student effect; and \(e_{0yk}\) = random time effect.

Model 1b added T1 leadership ability scores to the baseline model, which was used to indicate how much of the variance in school and individual student scores could be explained in terms of the T1 variable. The results presented in Figure 8.2 demonstrate that the variance at the individual student level was reduced substantially by controlling for T1 leadership ability (.488 to .230). Hence, the majority of between-individual variation could be explained in terms of pre-existing differences that were measured prior to the start of the program. The introduction of T1 scores into the model also decreased the school level variance to .000. This shows that the differences among schools were reduced somewhat after controlling for the effect of T1 leadership ability. In contrast, the inclusion of the pre-test score did not have a sizable effect on the variance for test occasion (.308 to .294). Logically, it could not be because the same T1 measure was a covariate for both T2 and T3 (i.e., for a given student, T1 scores were constant).
\[ \text{lead}_{ijk} \sim N(XB, \Omega) \]
\[ \text{lead}_{ijk} = \beta_{0ijk}\text{cons} + 0.538(0.027)\text{t1lead}_{jk} + \varepsilon_{ijk} \]
\[ \beta_{0ijk} = 0.014(0.026) + \nu_{0k} + \mu_{ijk} + e_{0ijk} \]
\[
\begin{bmatrix}
\nu_{0k} \\
\mu_{ijk}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000 & 0.000 \\
0.000 & 0.230
\end{bmatrix}
\]
\[
\begin{bmatrix}
\varepsilon_{ijk}
\end{bmatrix} \sim N(0, \Omega_\varepsilon) : \Omega_\varepsilon = \begin{bmatrix}
0.294 & 0.021
\end{bmatrix}
\]

Figure 8.2. Model 1b: Effect of T1 leadership ability on post-intervention leadership ability outcomes. In the model, lead_{ijk} is the outcome measure for individual j of the kth school at time i, XB = fixed part of the model; \( \Omega \) = covariance matrix; \( \beta_{0ijk} \) = intercept; t1gnschool = time 1 general school self-concept; \( \nu_{0k} \) = random school effect; \( \mu_{ijk} \) = random student effect; and \( e_{ijk} \) = random time effect.

In Model 2a, Time 1 leadership ability (T1lead) and Time were added to the model, as well as four variables designed to test the effects of contrast set 1 (see Chapter 5 for a detailed description of the three contrast sets used in the present study). These four additional included Expvs.C1C2, C1vs.C2, Expvs.C1C2 x Time, and C1vs.C2 x Time. The results from this model have been presented in Figure 8.3. Of primary importance to the present study are the effects for Expvs.C1C2 and the Expvs.C1C2 by Time interaction. The parameter estimate (and standard error) for Expvs.C1C2 demonstrate that the differences between the experimental group and control groups (average of C1 and C2) was significant across T2 and T3 (.066 \( \pm \) .025 > 1.96). The direction of the parameter estimate was positive which illustrates that participants in the experimental group reported higher leadership ability scores than participants in the control groups, after the effects of Time 1 scores had been controlled. Furthermore, the parameter estimate (and standard error) for Expvs.C1C2 x Time was not significant (\( -.005 \pm .017 < 1.96 \)), demonstrating that the effects of the intervention of leadership ability were maintained over time. Even though the interaction was not statistically significant, for purposes of illustration, a graph of the interaction is presented in Figure 8.4 to verify this interpretation. Following the advice of Hox (1995; also see Harwell, 1998), standardised values, rather than raw scores, were imputed into the regression equation from the multilevel analyses and plotted on the graph in order to accurately represent the effects (see
Figure 8.4). This graph shows that the experimental group reported higher leadership ability scores than the control groups at T2. Between T2 and T3, participants in the experimental and control groups reported decreases in leadership ability. However, this effect was not significant (as indicated by the non-significant results for Time in Model 2). The lines for the experimental and control groups are roughly parallel, which signifies a non-significant interaction. Thus, the positive effects of the intervention on leadership ability self-concept were maintained over the T2-T3 follow-up period.

\[
\begin{align*}
\text{lead}_{ijk} & \sim N(\beta_{0ik} + \beta_{1ij} \text{cons} + 0.526(0.027) t1 \text{lead}_{ijk} + 0.066(0.025) \text{expvs.c1c2}_{ijk} + -0.025(0.029) \text{c1vs.c2}_{ijk} + -0.033(0.021) \text{time}_{ijk} + -0.005(0.017) \text{expvs.c1c2.time}_{ijk} + 0.008(0.029) \text{c1vs.c2.time}_{ijk}) \\
\beta_{0ik} & = 0.042(0.030) + v_{0k} + u_{0i} + e_{0ik} \\
\begin{bmatrix} v_{0k} \\ u_{0i} \\ e_{0ik} \end{bmatrix} & \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.225(0.027) \\ 0.293(0.021) \end{bmatrix} \\
\end{align*}
\]

*Figure 8.3. Model 2a: Effect of T1 leadership ability, expvs.c1c2, c1vs.c2, time, expvs.c1c2 x time and c1vs.c2 x time on post-intervention leadership ability scores. In the model, lead_{ijk} is the outcome measure for individual j of the kth school at time i. \( \beta_{0ik} \) is fixed part of the model; \( \Omega \) is covariance matrix; \( \beta_{ij} \) is intercept; t1lead = time 1 leadership ability; time = T2 and T3; expvs.c1c2 = experimental group - (mean control group 1 and control group 2); c1vs.c2 = control group 2 - control group 1; v_{0k} = random school effect; u_{0i} = random student effect; and e_{0ik} = random time effect.*

The effects for C1vs.C2, and the C1vs.C2 by Time interaction were also important in Model 2a as they were used to detect differences between the two control groups over the two post-test occasions (see Figure 8.3). The parameter estimate (and standard error) for C1vs.C2 indicate that there were no significant differences in leadership ability scores (averaged across T2 and T3) between the two control groups \((-0.025 \div 0.029 < 1.96)\). In addition, the parameter estimate (and standard error) for C1vs.C2 x Time shows that the equivalence of the control groups in leadership scores remained stable over time (i.e., T2 to T3; 0.008 \div 0.020 < 1.96).
Figure 8.4. Change in leadership ability (Lead) for the experimental and control groups over T2 to T3. Post-intervention Lead scores were standardised in terms of the mean and SD of T1 scores.

Model 2b included T1 leadership ability and Time, as well as four variables designed to test the effects of contrast set 2. These four additional variables were ExpC2vs.C1, Expvs.C2, ExpC2vs.C1 x Time, and Expvs.C2 x Time. The results produced from this model are shown in Figure 8.5. The effects of ExpC2vs.C1 and ExpC2vs.C1 x Time were not particularly important and only included in the model so that the contrast would be orthogonal. Alternatively, the effects for Expvs.C2 and Expvs.C2 x Time were critical as they tested whether the experimental group differed significantly from C2 across the two post-intervention test occasions. The parameter estimate (and standard error) for Expvs.C2 demonstrates that the differences between the experimental group and C2 were significant across T2 and T3 (.112±.042 >1.96) (see Figure 8.5). The estimate was positive which indicates that the experimental group reported significantly higher leadership ability scores than control group 2, after the effects of Time 1 scores had been taken into account. Furthermore, the results for Expvs.C2 x Time reveal that the difference in leadership ability scores for those in the experimental group compared to those in C2 were maintained over time (−.011±.028 <1.96).
lead_{ij} \sim N(X_{i}, \Omega) \\
lead_{ij} = \beta_{0ijk} \text{cons} + 0.526(0.027)t1lead_{ij} + 0.020(0.019)\text{expc2vs.c1}_{ij} + 0.112(0.042)\text{expvs.c2}_{ij} + \\
-0.033(0.021)\text{time}_{ij} + 0.002(0.013)\text{expc2vs.c1.time}_{ij} + -0.011(0.028)\text{expvs.c2.time}_{ij} \\
\beta_{0ijk} = 0.042(0.030) + v_{0j} + u_{0ij} + e_{0ijk} \\
\begin{bmatrix} v_{0j} \\ u_{0ij} \\ e_{0ijk} \end{bmatrix} \sim N(0, \Omega) \\
\Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.225(0.027) \\ 0.293(0.021) \end{bmatrix} \\
-2*\text{loglikelihood}(IGLS Deviance) = 2059.385(980 of 1716 cases in use) 

Figure 8.5. Model 2b: Effect of T1 leadership ability, expc2vs.c1, expvs.c2, time, expc2vs.c1 x time and expvs.c2 x time on post-intervention leadership ability scores. In the model, lead_{ij} is the outcome measure for individual j of the kth school at time i. X_{i} = fixed part of the model; \Omega = covariance matrix; \beta_{0ijk} = intercept; t1lead = time 1 leadership ability; time = T2 and T3; expc2vs.c1 = (mean experimental group and control group 2) -control group 1; expvs.c2 = experimental group – control group 2; v_{0j} = random school effect; u_{0ij} = random student effect; and e_{0ijk} = random time effect.

Model 2c was designed to test the effects of contrast set 3. The variables included in this model were C2vs.C1Exp, Expvs.C1, C2vs.C1Exp x Time, and Expvs.C1 x Time. In this model, the effects for Expvs.C1 and Expvs.C1 x Time were of prime importance as they tested for differences between the experimental group and C1. As shown in Figure 8.6, the parameter estimate for Expvs.C1 was significant (.086÷.040 > 1.96), indicating that participants in the experimental group reported higher leadership ability scores than participants in C1 (across T2 and T3) after the effects of the corresponding T1 variable were controlled. In addition, the results for Expvs.C1 x Time reveal that the difference in leadership ability scores between the experimental group and C1 were maintained over time (−.003÷.027 < 1.96). For Model 2c, the effects for C2vs.C1Exp and C2vs.C1Exp x Time were unimportant and only included so that the contrasts would be orthogonal.
lead_{jk} \sim N(XB, \Omega)
lead_{jk} = \beta_{0jk} + 0.526(0.027)\times lead_{jk} + -0.046(0.020)\times c2vs.c1exp_{jk} + 0.086(0.040)\times expvs.c1_{jk} + -0.033(0.021)\times time_{jk} + 0.006(0.014)\times c2vs.c1exp.time_{jk} + -0.003(0.027)\times expvs.c1.time_{jk}
\beta_{0jk} = 0.042(0.030) + v_{0k} + u_{0jk} + e_{0jk}

\begin{bmatrix} v_{0k} \\ e_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.225(0.027) \\ 0.293(0.021) \end{bmatrix}

-2*\text{loglikelihood} \text{(IQLS Deviance)} = 2059.385 (980 of 1716 cases in use)

Figure 8.6. Model 2c: Effect of T1 leadership ability, c2vs.c1exp, expvs.c1, time, c2vs.c1exp x time and expvs.c1 x time on post-intervention leadership ability scores. In the model, lead_{jk} is the outcome measure for individual j of the kth school at time i. XB = fixed part of the model; \Omega = covariance matrix; \beta_{0jk} = intercept; lead = time 1 leadership ability; time = T2 and T3; c2vs.c1exp = control group 2 - (mean control group 1 and experimental group); expvs.c1 = experimental group - control group 1; v_{0k} = random school effect; u_{0jk} = random student effect; and e_{0jk} = random time effect.

Finally, Model 3 was used to test for the presence of aptitude-treatment interaction effects. The variables of interest in this model were T1Lead x Expvs.C1C2 and T1Lead x Expvs.C1C2 x Time. Figure 8.7 shows that the parameter estimate for the T1lead x Expvs.C1C2 interaction was significant (-.069 \div .032 > 1.96). A graph of the interaction is presented in Figure 8.8 to clarify the nature of this interaction. The graph illustrates that the differences between the experimental and control groups were greater for students with low T1 leadership ability scores than students with high T1 scores. This suggests that students with lower prior levels of leadership ability benefited more from taking part in the program.
lead_{jk} \sim N(XB, \Omega)
lead_{jk} = \beta_{0jk} + 0.470(0.036)time_{jk} + 0.093(0.028)expvs.clc1_{jk} + 0.030(0.028)clvs.c2_{jk} + 
-0.035(0.019)time_{jk} + 0.067(0.022)time_{jk}expVs.clc2_{jk} + 0.053(0.029)time_{jk}clvs.c2_{jk} + 
-0.003(0.023)time_{jk}time_{jk} + 0.010(0.020)time_{jk}expVs.clc2.time_{jk} + 
-0.022(0.021)time_{jk}clvs.c2.time_{jk}

\beta_{0jk} = 0.067(0.032) + \nu_{0jk} + u_{0jk} + e_{0jk}

\begin{bmatrix}
\nu_{0jk} \\
u_{0jk}
\end{bmatrix} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix}

\begin{bmatrix}
u_{0jk} \\
\end{bmatrix} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.217(0.027) \end{bmatrix}

\begin{bmatrix}
u_{0jk} \\
\end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.294(0.021) \end{bmatrix}

-2*logliklihood(IGLS Deviance) = 2050.147 (980 of 1716 cases in use)

Figure 8.7. Model 3: Aptitude-treatment interaction model for leadership ability. In the model, lead_{jk} is the outcome measure for individual j of the kth school at time t. XB = fixed part of the model; \Omega = covariance matrix; \beta_{0jk} = intercept; t1lead = time 1 leadership ability; time = T2 and T3; expVs.clc1 = experimental group - (mean control group 1 and control group 2); clvs.c2 = control group 2 - control group 1; \nu_{0jk} = random school effect; u_{0jk} = random student effect; and e_{0jk} = random time effect.

Figure 8.8. Relationship between post-intervention leadership ability scores (Lead) and corresponding T1 scores (T1Lead) for the experimental and control groups. T1Lead scores were standardised to have a mean = 0 & SD = 1. Post-intervention Lead scores were standardised in terms of the mean and SD of T1 scores.
Summary of Results for Leadership Ability

The results from three key models were explored to establish the effects of the intervention on student's leadership ability. Model 1 demonstrated that most of the variance in leadership ability scores was at the individual student and test occasion level. On the other hand, there was little variation between schools.

The findings from Model 2a showed that, across the post-intervention test occasions, students in the experimental group reported higher leadership ability scores than the average of the two control groups, after the effects of the initial scores in this domain were controlled. The results from this model also indicated that there were no significant differences between the two control groups across T2 and T3.

Models 2b and 2c were important in testing the impact of the intervention on leadership ability results separately for the two control groups. The results from these models were consistent with Model 1 in showing that across the post-intervention test occasions that (a) the experimental group reported significantly higher leadership scores than C2, and (b) the experimental group reported significantly higher leadership scores than C1. The results of Models 2b and 2c also provide evidence for the stability of the effects of the intervention with the gains found for the experimental group in comparison to the control groups being maintained over time.

In view of the consistent pattern of statistically significant effects found for this scale, the results clearly indicate that the intervention had a positive effect and sustained effect on leadership ability for the experimental group. Further tests examining aptitude-treatment interaction effects (Model 3) also suggest that peer leaders with lower prior levels of leadership ability benefited more from taking part in the intervention.

In the following sections, the effects of the program on additional psychological outcomes are explored. As past research has provided little direction for clear predictions to be made, this issue was formulated as a research question in Chapter 4. The a priori hypotheses for Year 7 students were used as advanced organiser for the analyses pursued, with the results being presented in the same order as the hypotheses.
School Self-Concept

Effects on Global School Self-Concept

Three models were used to test the effects of the program on the global school self-concept scores of students in the experimental group compared with those in the control groups. A summary the most important results from these models has been presented in Table 8.3. More comprehensive results for global school self-concept can be found in Appendix G-2.

The findings for the baseline components model (Model 1) indicate that there was significant variance at the individual student ($\sigma^2_{u} = .846, SE = .055$) and test occasion level ($\sigma^2_{e} = .246, SE = .017$). As can be seen, there was considerably more variance between individual students than between test occasions. Calculation of the intra-class correlations indicate that 77.5% of the variance was at the individual student level and 22.5% was at the test occasion level. The results showed that the intercepts of the three schools did not differ from one another ($\sigma^2_{y} = .000, SE = .000$).

In Model 2a, the results for Expvs.C1C2 denote that the experimental group scored significantly different from the average of the two control groups (Est. = .069, $SE = .029$). The parameter estimate was positive which suggests that students in the experimental group reported higher global school self-concept scores than participants in the control groups (across T2 and T3), after the effects of T1 scores had been controlled. Furthermore, the Expvs.C1C2 by Time interaction was not significant (Est. = -.002, $SE = .016$) and illustrates that the positive effects of the intervention on global school self-concept scores were maintained over time.

However, in Model 2a the effects for C1vs.C2 in Model 2a showed that there were significant differences between the two control groups across T2 and T3 (Est. = .097, $SE = .033$). The positive direction of the parameter estimate demonstrates that students in C2 scored significantly higher global school self-concept scores than students in C1, after the effects of T1 scores were taken into account.
### Table 8.3

*Multilevel Models for Year 10/11 Students on the Global School Self-Concept Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.065</td>
<td>-.039</td>
<td>-.039</td>
<td>-.039</td>
<td>-.033</td>
</tr>
<tr>
<td>T1GnSchl</td>
<td>.683 (.031)</td>
<td>.683 (.031)</td>
<td>.683 (.031)</td>
<td>.660 (.040)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.013 (.019)</td>
<td>.013 (.019)</td>
<td>.013 (.019)</td>
<td>.012 (.018)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.069 (.029)</td>
<td>.078 (.032)</td>
<td>.099 (.032)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.097 (.033)</td>
<td>.055 (.047)</td>
<td>.152 (.045)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.152 (.045)</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.002 (.016)</td>
<td>.003 (.027)</td>
<td>-.008 (.025)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.011 (.019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.005 (.007)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>-.005 (.007)</td>
<td></td>
<td>-.012 (.035)</td>
<td></td>
</tr>
<tr>
<td>T1GnSchl x Expvs.C1C2</td>
<td>.005 (.007)</td>
<td></td>
<td></td>
<td></td>
<td>-.025 (.018)</td>
</tr>
<tr>
<td>T1GnSchl x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$, between school</td>
<td>.000 (.000)</td>
<td>.005 (.007)</td>
<td>.005 (.007)</td>
<td>.005 (.007)</td>
<td>.006 (.007)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$, between student</td>
<td>.846 (.055)</td>
<td>.366 (.032)</td>
<td>.366 (.032)</td>
<td>.366 (.032)</td>
<td>.367 (.032)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$, between test occasion</td>
<td>.246 (.017)</td>
<td>.245 (.018)</td>
<td>.245 (.018)</td>
<td>.245 (.018)</td>
<td>.242 (.018)</td>
</tr>
</tbody>
</table>

*Note.* T1GnSchl = Time 1 global school self-concept; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: Positive values indicate higher values for control group 2; ExpC2 vs. C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

The results from Models 2b and 2c further clarify to the nature of the results. The effects for Expvs.C2 were not significant (Est. = .055, SE = .047), demonstrating that there were no sizable differences between the experimental group and C2. Alternatively, the effects for Expvs.C1 (Est. = .152, SE = .045) were significant, which indicates that global school self-concept scores of the experimental group
were higher than those from C1. In sum, the results of Models 2a through 2c indicate that both experimental and C2 participants reported higher global school self-concept scores than C1 students. Finally, the results for Model 3 show that there were no significant aptitude-treatment interaction effects present on the global school self-concept scale.

**Effects on Verbal Self-Concept**

A summary of the results for verbal self-concept are presented in Table 8.4. The results for the baseline components model (Model 1) indicate that most of the variation in verbal self-concept scores could be explained by differences at the individual student level ($\sigma^2_u = .840, SE = .054$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_e = .234, SE = .016$). Calculation of the intra-class correlation indicated that 75.2% of the variance was at the individual student level, 21.0% was at the test occasion level and only 3.8% was at the school level.

For the verbal self-concept scale, there were no significant effects for Expvs.C1C2 (Est. = .042, $SE = .028$) or for the Expvs.C1C2 by Time interaction (Est. = .000, $SE = .015$; see Model 2a, Table 8.4). These findings suggest that there were no significant overall effects of the program on verbal self-concept across T2 and T3. For Model 2a, significant differences between C1 and C2 were detected over the post-intervention test occasions (Est. = .115, $SE = .032$). The positive direction of the parameter estimate indicates that students in C2 reported significantly higher verbal self-concept scores than students in C1, after the effects of T1 scores were taken into account.

In Model 2b the effects for Expvs.C2 were not significant (Est. = .006, $SE = .046$), which denotes that there were no sizable differences between the experimental group and C2. Alternatively, for Model 2c the effects or Expvs.C1 were significant (see Model 2c; Est. = .121, $SE = .044$), suggesting that the experimental group scored significantly higher than the control group across T2 and T3. Furthermore, the results for Expvs.C1 x Time was not significant (Est. = -.011, $SE = .024$), indicating that the positive effects of leadership ability were maintained over time. Thus, the results of Models 2a through 2c demonstrate that both experimental and control group 2 participants reported higher verbal self-concept scores than C1 students.
Furthermore, the results for Model 3 reveal that there was no significant aptitude-treatment interaction effects present on the verbal self-concept scale.

Table 8.4

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 2c</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.012</td>
<td>.052</td>
<td>.052</td>
<td>.052</td>
<td>.057</td>
</tr>
<tr>
<td>T1Verbal</td>
<td>.688 (.030)</td>
<td>.688 (.030)</td>
<td>.688 (.030)</td>
<td>.671 (.036)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.016 (.018)</td>
<td>.016 (.018)</td>
<td>.016 (.018)</td>
<td>.020 (.016)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.042 (.028)</td>
<td></td>
<td></td>
<td>.048 (.029)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.115 (.032)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.006 (.046)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.121 (.044)</td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.000 (.015)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.021 (.018)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.010 (.025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>-.011 (.024)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Verbal x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>-.020 (.030)</td>
<td></td>
</tr>
<tr>
<td>T1Verbal x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>-.022 (.016)</td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{b}$: between school</td>
<td>.042 (.038)</td>
<td>.013 (.013)</td>
<td>.013 (.013)</td>
<td>.013 (.013)</td>
<td>.013 (.013)</td>
</tr>
<tr>
<td>$\sigma^2_{s}$: between student</td>
<td>.840 (.054)</td>
<td>.364 (.031)</td>
<td>.364 (.031)</td>
<td>.364 (.031)</td>
<td>.365 (.031)</td>
</tr>
<tr>
<td>$\sigma^2_{e}$: between test occasion</td>
<td>.234 (.016)</td>
<td>.215 (.016)</td>
<td>.215 (.016)</td>
<td>.215 (.016)</td>
<td>.213 (.016)</td>
</tr>
</tbody>
</table>

Note. T1Verbal = Time 1 verbal self-concept; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Summary of Results for School Self-Concept

Overall, the results demonstrate that both experimental and C2 students (i.e., 2002 study participants) reported higher global school and verbal self-concept scores than C1 students (i.e., 2001 study participants) across T2 and T3. For both global school and verbal self-concept, the effects for ExpC2 vs. C1 were significant, showing that experimental and C2 participants reported significantly higher scores than C1 participants, after the corresponding T1 scores were controlled. The findings from additional analyses were consistent with this pattern of results. For both of these scales, Model 2a demonstrated that C2 scored significantly higher than C1, after the corresponding T1 scores were controlled. Similarly, Model 2c illustrated that the experimental group scored significantly higher global school and verbal self-concept scores than C1, across the two post-intervention test occasions. On the other hand, the results from Model 2b showed that there were no significant differences between the experimental group and C2 (across T2 and T3) on both the global school and verbal self-concept scales.

In sum, these results provide limited support for the enhancement of school self-concepts for the peer support leaders. While the leaders reported significantly higher verbal and general self-concept scores than C1 following the intervention, their scores were not significantly different from C2.
School Citizenship

Effects on Perceptions of Bullying

Three models were utilised to examine whether the experimental group reported lower pro-bully scores and higher pro-victim scores than students in the control groups following the intervention. Summaries of the results for the pro-bully and pro-victim scales are presented in Table 8.5 and Table 8.6, respectively.

For the pro-bully scale, the results for Model 1 indicate that most of the variation in pro-bully scores could be explained by differences at the individual student level ($\sigma^2_w = .492$, $SE = .049$) and at the test occasion level ($\sigma^2_e = .469$, $SE = .033$). Calculations of the intra-class correlation indicated that 49.8% of the variance was at the individual student level, 47.5% was at the test occasion level and only 2.7% was at the school level.

A similar pattern of results were found for pro-victim attitudes (see Model 1, Table 8.6), where there was also significant variation between individual students ($\sigma^2_w = .394$, $SE = .052$) and test occasions ($\sigma^2_e = .636$, $SE = .045$). However, there was more variance at the test occasion level (59.7%) than at the individual student level (36.9%). Again, there was little variance at the school level ($\sigma^2_v = .036$, $SE = .033$; i.e., only 3.4%).

For the pro-bully scale (see Model 2a, Table 8.5), a significant main effect was found for Expvs.C1C2 (Est. = -.089, $SE = .029$). The negative direction of the parameter estimate indicates that participants in the experimental group reported significantly lower pro-bully scores than the control groups (across T2 and T3), after the effects of T1 scores had been taken into account. Furthermore, the Expvs.C1C2 by Time interaction was not significant (Est. = .007, $SE = .021$), demonstrating that the effects of the intervention on pro-bully scores were stable over time (i.e., between T2 and T3). Model 2a also reveals that no significant differences were present between C1 and C2 across the two post-intervention test occasions (Est. = -.009, $SE = .034$). Moreover, the interaction between C1vs.C2 and Time was non-significant (Est. = -.009, $SE = .034$), indicating that there were no sizeable differences between the two control groups over time.
Table 8.5  
**Multilevel Models for Year 10/11 Students on the Pro-Bully Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.028</td>
<td>-.008</td>
<td>-.008</td>
<td>-.008</td>
<td>-.011</td>
</tr>
<tr>
<td>T1Bully</td>
<td>.537 (.034)</td>
<td>.537 (.034)</td>
<td>.537 (.034)</td>
<td>.528 (.042)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.003 (.025)</td>
<td>-.003 (.025)</td>
<td>-.003 (.025)</td>
<td>-.007 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>-.089 (.029)</td>
<td></td>
<td>-.093 (.032)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.009 (.034)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>-.129 (.048)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td>-.138 (.046)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.007 (.021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.034 (.025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>.027 (.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>-.007 (.032)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Bully x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>-.011 (.036)</td>
<td></td>
</tr>
<tr>
<td>T1Bully x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>-.015 (.024)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school</td>
<td>.027 (.025)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_v$: between student</td>
<td>.492 (.049)</td>
<td>.269 (.037)</td>
<td>.269 (.037)</td>
<td>.269 (.037)</td>
<td>.269 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_v$: between test occasion</td>
<td>.469 (.033)</td>
<td>.409 (.031)</td>
<td>.409 (.031)</td>
<td>.409 (.031)</td>
<td>.406 (.031)</td>
</tr>
</tbody>
</table>

*Note.* T1Bully = Time 1 pro-bully; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

For Model 2b, the effect for Expvs.C2 was significant (Est. = -.129, $SE = .048$). This finding suggests that participants in the experimental group reported significantly lower pro-bully scores than participants in C2, after controlling for the effects of corresponding Time 1 scores. Further, the results for Expvs.C2 x Time reveal that the differences between the experimental group and C2 in pro-bully attitudes were maintained over time (Est. = .027, $SE = .034$).
A significant effect was also found for Expvs.C1 on the pro-bully scale (see Model 2c; Est. = -.138, SE = .046) indicating that participants in the experimental group reported significantly lower pro-bully scores than participants in C1, after the effects of Time 1 scores had been controlled. The results for Expvs.C1 x Time also reveal that the differences between the experimental group and C1 were maintained over time (Est. = -.007, SE = .032). Finally, the findings for Model 3 indicate that there were no significant aptitude-treatment-interaction effects present for the pro-bully scale.

For the pro-victim scale (see Table 8.6), Model 2a uncovered a significant main effect for Expvs.C1C2 (Est. = .074, SE = .034). The positive direction of the parameter estimate demonstrates that participants in the experimental group reported significantly higher pro-victim scores than participants in the control groups across T2 and T3, after the effects of T1 scores had been taken into account. Furthermore, the Expvs.C1C2 by Time interaction was not significant (Est. = .005, SE = .024), which shows that the positive effects of the intervention on pro-victim attitudes were stable over time. Model 2a also indicates that there were no significant differences present between the two control groups over the two post-intervention test occasions (Est. = -.002, SE = .036) and T3 (Est. = -.016, SE = .029).

Models 2b and 2c found significant effects for Expvs.C2 (Est. = .113, SE = .051) and Expvs.C1 (Est. = .110, SE = .048), respectively. These findings demonstrate that the experimental group scored significantly higher pro-victim scores than C1 and C2 in separate analyses. In addition, the Expvs.C2 by Time (Est. = -.001, SE = .040) and Expvs.C1 by Time (Est. = .015, SE = .038) interactions were not significant, which gives further indication that group differences in pro-victim attitudes were consistent over time. The findings for Model 3 show that no aptitude-treatment interaction effects were present for the pro-victim scale.
Table 8.6

**Multilevel Models for Year 10/11 Students on the Pro-Victim Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.118</td>
<td>-.101</td>
<td>-.101</td>
<td>-.101</td>
<td>-.112</td>
</tr>
<tr>
<td>T1Victim</td>
<td>.451 (.035)</td>
<td>.451 (.035)</td>
<td>.451 (.035)</td>
<td>.452 (.045)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.015 (.029)</td>
<td>-.015 (.029)</td>
<td>-.015 (.029)</td>
<td>-.020 (.027)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.074 (.031)</td>
<td></td>
<td></td>
<td>.072 (.034)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.002 (.036)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td></td>
<td>.113 (.051)</td>
<td>.110 (.048)</td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.005 (.024)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.016 (.029)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>-.001 (.040)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>.015 (.038)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Victim x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>.013 (.039)</td>
<td></td>
</tr>
<tr>
<td>T1Victim x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>.005 (.028)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between school</td>
<td>.036 (.033)</td>
<td>.007 (.009)</td>
<td>.007 (.009)</td>
<td>.007 (.009)</td>
<td>.005 (.009)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between student</td>
<td>.294 (.052)</td>
<td>.223 (.044)</td>
<td>.223 (.044)</td>
<td>.223 (.044)</td>
<td>.214 (.043)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between test occasion</td>
<td>.636 (.045)</td>
<td>.579 (.043)</td>
<td>.579 (.043)</td>
<td>.579 (.043)</td>
<td>.581 (.043)</td>
</tr>
</tbody>
</table>

**Note.** T1Victim = Time 1 pro-victim; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

**Effects on Honesty/Trustworthiness**

The results from models testing the effects of the program on honesty/trustworthiness scores are presented in Table 8.7. The variance components model (Model 1) shows that there was considerably more variance at the individual student level ($\sigma^2_{\epsilon} = .732, SE = .057$) than at the test occasion level ($\sigma^2_{\epsilon} = .419, SE$...
=.029). Again, there was virtually no variance between schools (\(\sigma^2_{\gamma} = .014, SE = .016\)). Calculation of the intra-class correlation demonstrated that 62.8% of the variance was at the individual student level, 36.0% was at the test occasion level, and 1.2% was at the school level.

The results for Model 2a (see Table 8.8) show that there was a significant effect for Expvs.C1C2 on the honesty/trustworthiness scale (Est. = .109, SE = .029). The parameter estimate was positive, which indicates that participants in the experimental group reported significantly higher honesty/trustworthiness scores than participants in the control groups, after controlling for the effects of the corresponding T1 scores. The interaction between Expvs.C1C2 and Time was not significant (Est. = -.016, SE = .019), illustrating that the positive effects of the intervention on honesty/trustworthiness scores were maintained over time.

In Model 2b, the effects for Expvs.C2 (Est. = .164, SE = .048) were significant. As the slope of the parameter estimate is positive, participants in the experimental group reported significantly higher honesty/trustworthiness scores than participants in C2, after the effects of Time 1 scores had been partialled out. Furthermore, the results for Expvs.C2 x Time reveal that the differences between the experimental group and C2 were maintained over time (Est. = -.031, SE = .031).

The results for Model 2c demonstrate that there was a significant effect for Expvs.C1 (Est. = .163, SE = .046). This finding shows that participants in the experimental group reported significantly higher honesty/trustworthiness scores than participants in C1, after the effects of Time 1 scores had been taken into account. In addition, the results for Expvs.C1 x Time reveal that the differences between the experimental group and C1 were maintained over time (Est. = -.018, SE = .030). No significant aptitude-treatment interaction effects were present for the honesty/trustworthiness scale (see Model 3).
Table 8.7

Multilevel Models for Year 10/11 Students on the Honesty/Trustworthiness Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.053</td>
<td>.009</td>
<td>.009</td>
<td>.009</td>
<td>.015</td>
</tr>
<tr>
<td>T1Honest</td>
<td>.648 (.030)</td>
<td>.648 (.030)</td>
<td>.648 (.030)</td>
<td>.630 (.038)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.009 (.023)</td>
<td>-.009 (.023)</td>
<td>-.009 (.023)</td>
<td>-.003 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.109 (.029)</td>
<td></td>
<td></td>
<td>.116 (.030)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.002 (.033)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>.164 (.048)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td>.163 (.046)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.016 (.019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.013 (.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.031 (.031)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>-.018 (.030)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Honest x Expvs.C1C2</td>
<td>-.027 (.033)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Honest x Expvs.C1C2 x Time</td>
<td>.007 (.021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\text{e}}$ between school</td>
<td>.014 (.016)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{e}}$ between student</td>
<td>.732 (.057)</td>
<td>.322 (.036)</td>
<td>.322 (.036)</td>
<td>.322 (.036)</td>
<td>.321 (.036)</td>
</tr>
<tr>
<td>$\sigma^2_{\text{e}}$ between test occasion</td>
<td>.419 (.029)</td>
<td>.354 (.026)</td>
<td>.354 (.026)</td>
<td>.354 (.026)</td>
<td>.354 (.026)</td>
</tr>
</tbody>
</table>

*Note. T1Honest = Time 1 honesty/trustworthiness; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.*

Summary of Results for School Citizenship

The results provide good evidence to suggest that the intervention had a positive impact on the peer support leaders' pro-bully attitudes. The results from Model 2a showed that, across the post-intervention test occasions, students in the
experimental group reported lower pro-bully scores than the average of the two control groups, after the effects of the initial scores in this domain were controlled. Support was also found for the stability of the effects on the intervention in these domains, with the declines in pro-bullying attitudes found for the experimental group in comparison to the control groups being maintained over time. Furthermore, results from additional analyses testing the effects of the intervention separately for the two control groups were consistent with the results found above and illustrated that a) the experimental group reported significantly lower pro-bully scores than C2 and b) the experimental group reported significantly lower pro-bully scores than C1.

The results also denoted that the intervention was successful in enhancing leaders’ pro-victim attitudes and honesty/trustworthiness. Model 2a for both of these scales found significant effects for Expvs.C1C2, indicating that the experimental group reported significantly higher pro-victim and honesty/trustworthiness scores than the average of the two control groups, after the corresponding T1 scores were taken into account. The findings from Models 2b and 2c were consistent with this pattern of results, demonstrating that the experimental group scored significantly higher scores on these two scales than C1 and C2 in separate analyses across T2 and T3.

Thus, the consistent pattern of statistically significant effects found for these three scales has demonstrated that the intervention had a positive and sustained effect on perceptions of bullying and honesty/trustworthiness for the experimental group. No aptitude-treatment interaction effects were present for any of the three scales (see Model 3), suggesting that the intervention was beneficial to peer leaders with both prior low and high levels of school citizenship.
Sense of Self

Effects on Self-Confidence

The results from models used to test the effects of the intervention on self-confidence are presented in Table 8.8. The results for Model 1 demonstrate that there was significant variance at the individual student ($\sigma^2_i = .654, SE = .056$) and test occasion level ($\sigma^2_c = .494, SE = .034$). However, there was no variation between schools ($\sigma^2_s = .000, SE = .000$). For the self-confidence scale, 57.0% of the variance was at the individual student level and 43% was at the test occasion level.

In Model 2a (see Table 8.9), there was a significant main effect for Exp vs. C1C2. (Est. = .093, $SE = .030$). The parameter estimate was positive, which indicates that the experimental group reported higher self-confidence scores than participants in the control groups (across T2 and T3), after the effects of T1 scores had been controlled. The Exp vs. C1C2 by Time interaction was not significant (Est. = .002, $SE = .022$), illustrating that the effects of the intervention on self-confidence scores were maintained over time. Furthermore, the results for Model 2 show that the self-confidence scores for the two control groups were not significantly different from one another across T2 and T3 (Est. = -.047, $SE = .035$) and over time (Est. = .013, $SE = .026$).

Model 2b found the presence of a significant effect for Exp vs. C2 (Est. = .163, $SE = .049$), which demonstrated that the experimental group reported significantly higher self-confidence scores than C2 across the post-intervention test occasions. In addition, the results for Exp vs. C2 x Time reveal that the differences between the experimental group and C2 were maintained over time (Est. = -.003, $SE = .036$).

Similarly, the results for Model 2c show that there were significant differences between the experimental group and C1 (Est. = .116, $SE = .047$). The slope of the parameter estimate indicates that the experimental group reported significantly higher self-confidence scores than C1, after the effects of T1 scores had been taken into account. In addition, the results for Exp vs. C1 x Time reveal that the differences between the experimental group and C1 were maintained over time (Est. = .010, $SE = .034$). No significant aptitude-treatment interaction effects were present for the self-confidence scale (see Model 3).
Table 8.8
Multilevel Models for Year 10/11 Students on the Self-Confidence Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 2c</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.149</td>
<td>-.113</td>
<td>-.113</td>
<td>-.113</td>
<td>-.113</td>
</tr>
<tr>
<td>T1SIfCon</td>
<td>.589 (.032)</td>
<td>.589 (.032)</td>
<td>.589 (.032)</td>
<td>.585 (.040)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.025 (.026)</td>
<td>-.025 (.026)</td>
<td>-.025 (.026)</td>
<td>-.032 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.093 (.030)</td>
<td></td>
<td></td>
<td>.091 (.030)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.047 (.035)</td>
<td></td>
<td></td>
<td>-.049 (.034)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.163 (.049)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td>.116 (.047)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.002 (.022)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.013 (.026)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.003 (.036)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.010 (.034)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SIfCon x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>.012 (.034)</td>
<td></td>
</tr>
<tr>
<td>T1SIfCon x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>.021 (.024)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\omega}$ between school</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\omega}$ between student</td>
<td>.654 (.056)</td>
<td>.290 (.040)</td>
<td>.290 (.040)</td>
<td>.290 (.040)</td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$ between test occasion</td>
<td>.494 (.034)</td>
<td>.480 (.035)</td>
<td>.480 (.035)</td>
<td>.480 (.035)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* T1SIfCon = Time 1 self-confidence; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

**Effects on Global Self Esteem**

A summary of the results from models used to test main effects and interactions for the global self-esteem scale are presented in Table 8.9. The estimates for the baseline components model (Model 1) indicated that the intercepts of the
three different schools did not differ from one another ($\sigma^2_v = .000$, $SE = .000$). The variances were significant at the individual student ($\sigma^2_u = .767$, $SE = .057$) and test occasion level ($\sigma^2_e = .382$, $SE = .026$). Calculation of the intra-class correlation revealed that 66.8% of the variance in global self-esteem was at the individual student level and 33.2% was at the test occasion level.

For Model 2a (see Table 8.10), the effects for Expvs.C1c2 were significant (Est. = .083 $SE = .032$). The direction of the parameter estimate was positive, which demonstrates that participants in the experimental group reported significantly higher global self-esteem scores than participants in the control groups, after the effects of the corresponding T1 scores were controlled. The interaction between Expvs.C1C2 and Time was not significant (Est. = .000, $SE = .019$), denoting that the positive effects of the intervention on global self-esteem scores were maintained over time. Model 2a also reveals that no significant differences were present between the two control groups across the two post-intervention test occasions (Est. = -.049, $SE = .036$). In addition, the interaction between C1vs.C2 and Time was non-significant (Est. = .012, $SE = .022$), indicating that there were no sizeable differences between C1 and C2 over time.

In Model 2b, a significant result was found for Expvs.C2 (Est. = .149, $SE = .052$). As the slope of the parameter estimate was positive, participants in the experimental group reported significantly higher global self-esteem scores than participants in C2, after the effects of Time 1 scores had been partialled out. Furthermore, the results for Expvs.C2 x Time reveal that the differences between the experimental group and C2 were maintained over time (Est. = -.007, $SE = .031$).

Model 2c demonstrates that there was a significant effect for Expvs.C1 (Est. = .101, $SE = .049$). This finding illustrates that participants in the experimental group reported significantly higher global self-esteem scores than participants in C1, after controlling for the effects of corresponding Time 1 scores. In addition, the results for Expvs.C1 x Time reveal that the differences between the experimental group and C1 were maintained over time (Est. = .005, $SE = .030$). No significant aptitude-treatment interaction effects were found in Model 3.
### Table 8.9

*Multilevel Models for Year 10/11 Students on the Global Self-Esteem Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.057</td>
<td>-.010</td>
<td>-.010</td>
<td>-.010</td>
<td>-.011</td>
</tr>
<tr>
<td>T1GnSlf</td>
<td>.596 (.033)</td>
<td>.596 (.033)</td>
<td>.596 (.033)</td>
<td>.595 (.044)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.026 (.023)</td>
<td>-.026 (.023)</td>
<td>-.026 (.023)</td>
<td>-.028 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.083 (.032)</td>
<td></td>
<td>.083 (.033)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.049 (.036)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td>.149 (.052)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td>.101 (.049)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.000 (.019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.012 (.022)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.007 (.031)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>.005 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1GnSlf x Expvs.C1C2</td>
<td></td>
<td></td>
<td>.004 (.039)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1GnSlf x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td>.003 (.022)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_c$: between school</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_c$: between student</td>
<td>.767 (.057)</td>
<td>.416 (.040)</td>
<td>.416 (.040)</td>
<td>.416 (.040)</td>
<td>.417 (.040)</td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion</td>
<td>.382 (.026)</td>
<td>.341 (.025)</td>
<td>.341 (.025)</td>
<td>.341 (.025)</td>
<td>.341 (.025)</td>
</tr>
</tbody>
</table>

*Note.* T1GnSlf = Time 1 global self-concept; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

**Summary of Results for General Sense of Self**

In sum, the results demonstrate that the intervention had a positive impact on peer support leaders self-confidence and global self-esteem. The finding from Model 2a showed that, across the post-intervention test occasions, students in the
experimental group reported higher self-confidence and global self-esteem scores than the average of the two control groups, after the effects of the initial scores in this domain were controlled. The results from this model also revealed that there were no significant differences between the two control groups across T2 and T3.

Models 2b and 2c were important in testing the impact of the intervention on leadership ability results separately for the two control groups. The results from Model 2b were consistent with Model 2a and showed that the experimental group reported significantly higher self-confidence and global self-esteem scores than C2 across the post-intervention test occasions. Likewise, Model 2c illustrated that the experimental group reported significantly self-confidence and global self-esteem scores than C1 over T2 and T3.

Therefore, the constant pattern of statistically significant effects found for the self-confidence and global self-esteem scales provides good evidence to suggest that the intervention had a positive and sustained effect on general sense of self for the experimental group. Further tests examining aptitude-treatment interaction effects (Model 3), also indicated that peer leaders with both prior low and high levels of self-confidence and global self-esteem benefited from taking part in the intervention.
Connectedness

Effects on Peer Relations

The effects of the program on peer relations were explored by examining students same-sex and opposite-sex relation scale scores. Three models were used to test for the effects on each of these scales for students in the experimental and control groups.

A summary of the results for same-sex relations self-concept are presented in Table 8.10. The baseline components model for same-sex relations self-concept (Model 1) found significant variance at the individual student ($\sigma^2_{u}: = .687, SE = .058$) and test occasion level ($\sigma^2_{e}: = .499, SE = .034$). Calculation of the intra-class correlation determined that 57.9% of the variance was at the individual student level, 42.0% was at the test occasion level and only 0.1% was at the school level. A similar pattern of results was found for the opposite-sex relations self-concept scale (see Model 1, Table 8.12). Significant variance was found at the individual student ($\sigma^2_{u}: = .658, SE = .053$) and test occasion level ($\sigma^2_{e}: = .430, SE = .030$). For opposite-sex relations self-concept, 60.5% was at the individual student level and 39.5% was at the test occasion level. On both of the peer relations scales, the results demonstrate that the intercepts of the different schools did not differ from one another (Same-sex $\sigma^2_{v}: = .001, SE = .004$; Opposite-sex $\sigma^2_{v}: = .000, SE = .000$).

For same-sex relations self-concept (see Table 8.10), Model 2a evidenced a significant effect for Expvs.C1C2 (Est. = .085, SE = .034). These results indicate that students in the experimental group reported significantly higher same-sex relations self-concept scores than students in the control groups, after the effects of T1 scores had been controlled. Furthermore, the Expvs.C1C2 by Time interaction was not significant (Est. = .021, SE = .022), demonstrating that the positive effects of the intervention on same-sex relations self-concept were stable over time (i.e., between T2 and T3).

Model 2a also revealed that no significant differences were present between the two control groups across T2 and T3 (Est. = .009, $SE = .039$). Moreover, the interaction between C1vs.C2 and Time was non-significant (Est. = .027, $SE = .026$), indicating that the equivalence of the control group scores was maintained over time.
Table 8.10
Multilevel Models for Year 10/11 Students on the Same-Sex Relations Self-Concept Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.208</td>
<td>-.164</td>
<td>-.164</td>
<td>-.164</td>
<td>-.169</td>
</tr>
<tr>
<td>T1SmeSx</td>
<td>.476 (.035)</td>
<td>.476 (.035)</td>
<td>.476 (.035)</td>
<td>.474 (.045)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.015 (.026)</td>
<td>-.015 (.026)</td>
<td>-.015 (.026)</td>
<td>-.032 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.085 (.034)</td>
<td></td>
<td>.081 (.034)</td>
<td>.081 (.034)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.009 (.039)</td>
<td></td>
<td></td>
<td>.122 (.056)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td>.122 (.056)</td>
<td>.132 (.053)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.132 (.053)</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.021 (.022)</td>
<td>.027 (.026)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.018 (.036)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.045 (.034)</td>
<td></td>
<td></td>
<td></td>
<td>.045 (.034)</td>
</tr>
<tr>
<td>T1SmeSx x Expvs.C1C2</td>
<td></td>
<td>.012 (.040)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SmeSx x Expvs.C1C2 x Time</td>
<td>.022 (.024)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\epsilon} ): between school variance</td>
<td>.001 (.004)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>( \sigma^2_{\omega} ): between student variance</td>
<td>.687 (.058)</td>
<td>.454 (.048)</td>
<td>.454 (.048)</td>
<td>.454 (.048)</td>
<td>.446 (.047)</td>
</tr>
<tr>
<td>Variance</td>
<td>.499 (.034)</td>
<td>.453 (.033)</td>
<td>.453 (.033)</td>
<td>.453 (.033)</td>
<td>.452 (.033)</td>
</tr>
</tbody>
</table>

*Note. T1SmeSx = Time 1 same-sex relations; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: Positive values indicate higher values for the experimental group; C1vs.C2 Est.: Positive values indicate higher values for control group 2; Expvs.C2 vs. C1 Est.: Positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: Positive values indicate higher values for the experimental group; Expvs.C1 Est.: Positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.*

In Model 2b, a significant result was found for Expvs.C2 (Est. = .122, SE = .056). The positive direction of the parameter estimate indicates that participants in the experimental group reported significantly higher same-sex relations self-concept scores than participants in C2, after the effects of Time 1 scores had been taken into
account. Furthermore, the results for Expvs.C2 x Time reveal that the differences between the experimental group and C2 were sustained over time (Est. = .018, SE = .036).

The results for Model 2c demonstrate that there was a significant effect for Expvs.C1 (Est. = .132, SE = .053). This finding shows that participants in the experimental group reported significantly higher same-sex relations self-concept scores than participants in C1, after the effects of Time 1 scores had been taken into account. In addition, the results for Expvs.C1 x Time reveal that the differences between the experimental group and C1 were maintained over time (Est. = .045, SE = .034). No significant aptitude treatment interaction effects were found in Model 3.

A similar pattern of results was found for opposite sex relations self-concept. In Model 2a (see Table 8.11), significant results was found for Expvs.C1C2 (Est. = .084, SE = .029). The positive direction of the parameter estimate indicates that students in the experimental group reported significantly higher opposite-sex relations self-concept scores than students in the control groups, after controlling for the effects of T1 scores. Furthermore, the Expvs.C1C2 by time interaction was not significant (Est. = .003, SE = .020), demonstrating that the positive effects of the intervention on opposite-sex relations self-concept were maintained over time.

Models 2b and 2c found significant effects for Expvs.C2 (Est. = .122, SE = .048) and Expvs.C1 (Est. = .129, SE = .046), respectively. These findings denote that the experimental group scored significantly higher opposite-sex relation self-concept scores than C1 and C2 in separate analyses. In addition, the Expvs.C2 by Time and Expvs.C1 by Time interactions were not significant, which gives further indication that group differences in opposite-sex relations self-concept scores were consistent over time. The results for Model 3 show that no aptitude-treatment interaction effects were present for the opposite-sex relations self-concept scale.
### Table 8.11
**Multilevel Models for Year 10/11 Students on the Opposite-Sex Relations Self-Concept Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.028</td>
<td>.011</td>
<td>.011</td>
<td>.011</td>
<td>.017</td>
</tr>
<tr>
<td>T1OppSx</td>
<td>.606 (.030)</td>
<td>.606 (.030)</td>
<td>.606 (.030)</td>
<td>.570 (.038)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.012 (.024)</td>
<td>-.012 (.024)</td>
<td>-.012 (.024)</td>
<td>-.016 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.084 (.029)</td>
<td>.091 (.029)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.007 (.034)</td>
<td>.122 (.048)</td>
<td></td>
<td></td>
<td>.129 (.046)</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.003 (.020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.019 (.024)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.013 (.033)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.005 (.031)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1OppSx x Expvs.C1C2</td>
<td></td>
<td>-.035 (.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1OppSx x Expvs.C1C2 x Time</td>
<td></td>
<td>.009 (.022)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_c$: between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_s$: between student variance</td>
<td>.658 (.053)</td>
<td>.304 (.036)</td>
<td>.304 (.036)</td>
<td>.304 (.036)</td>
<td>.300 (.036)</td>
</tr>
<tr>
<td>$\sigma^2_r$: between test occasion variance</td>
<td>.430 (.030)</td>
<td>.390 (.028)</td>
<td>.390 (.028)</td>
<td>.390 (.028)</td>
<td>.384 (.028)</td>
</tr>
</tbody>
</table>

*Note.* T1OppSx = Time 1 opposite-sex relations; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

### Effects on Cooperative Teamwork

The results from models used to test the effects of the program on cooperative teamwork are presented in Table 8.12. The baseline components model indicates that there was significant variance between individual students (Est. = .619, SE = .053)
and test occasions (Est. = .458, SE = .032). Of the estimated total variance, 57.5% was due to differences between individual students and 42.5% was due to differences between test occasions. There was no variance at the school level (Est. = .000, SE = .000).

Table 8.12

*Multilevel Models for Year 10/11 Students on the Cooperative Teamwork Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.145</td>
<td>-.106</td>
<td>-.106</td>
<td>-.106</td>
<td>-.103</td>
</tr>
<tr>
<td>T1CoTeam</td>
<td>.509 (.032)</td>
<td>.509 (.032)</td>
<td>.509 (.032)</td>
<td>.485 (.038)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.026 (.024)</td>
<td>-.026 (.024)</td>
<td>-.026 (.024)</td>
<td>-.036 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.058 (.031)</td>
<td></td>
<td></td>
<td>.061 (.031)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.012 (.035)</td>
<td></td>
<td></td>
<td>-.015 (.035)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.093 (.051)</td>
<td></td>
<td></td>
<td>.081 (.049)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.007 (.020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.002 (.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.011 (.032)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.009 (.031)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1CoTeam x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>-.016 (.032)</td>
<td></td>
</tr>
<tr>
<td>T1CoTeam x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>.040 (.019)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_v$: between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_x$: between student variance</td>
<td>.619 (.053)</td>
<td>.379 (.040)</td>
<td>.379 (.040)</td>
<td>.376 (.039)</td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_e$: between test occasion variance</td>
<td>.458 (.032)</td>
<td>.377 (.028)</td>
<td>.377 (.028)</td>
<td>.371 (.027)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* T1CoTeam = Time 1 cooperative teamwork; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
In Model 2a (see Table 8.19), although the parameter estimates were positive, there were no significant effects for Expvs.C1C2 (Est. = .058, SE = .031) or for the Expvs.C1C2 by Time interaction (Est. = .007, SE = .020). The effects for C1vs.C2 (Est. = -.012, SE = .035) as well as the C1vs.C2 by Time interaction (Est. = -.002, SE = .023) were not significant and demonstrate that there were little differences in time efficiency scores between the two control groups. Models 2b and 2c also found positive, but marginally non-significant results for Exp.vsC2 (Est. = .093, SE = .051) and Expvs.C1 (Est. = .081, SE = .049), respectively.

In Model 3, the effects for Expvs.C1C2 (Est. = .061, SE = .031) became marginally significant, suggesting that the experimental group reported significantly higher cooperative teamwork scores than the average of the two control groups across T2 and T3. Furthermore, Model 3 showed that the T1CoTeam x Expvs.C1C2 x Time interaction was significant. A graph is presented in Figure 8.9 to clarify the nature of the interaction.

![Graph](image)

**Figure 8.9.** Relationship between post-intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups at T2 and T3. Post-intervention CoTeam scores were standardised in terms of the mean and SD of T1 scores.
As shown in Figure 8.9, the experimental group reported higher cooperative teamwork scores than the control groups at T2 and T3. The lines for the experimental and control groups are roughly parallel, apart from that of the experimental group at T3. This line shows that, for students with lower T1 cooperative teamwork scores, the scores of the experimental group declined between T2 and T3. Alternatively, for students with higher T1 cooperative teamwork scores, the scores of the experimental group increased slightly between T2 and T3.

**Effects on Peer Support**

A summary of the results for the peer support scale are presented in Table 8.13. The baseline components model for peer support (Model 1) detected significant variance between individual students ($\sigma^2_{\mu} = .538, SE = .050$) and test occasions ($\sigma^2_{\epsilon} = .458, SE = .032$). For this scale, 53.9% of the variance was at the individual student level and 45.9% was at the test occasion level. The intercepts of the different schools did not differ from one another ($\sigma^2_{\gamma} = .002, SE = .005$; i.e., only 0.2%).

In Model 2a (see Table 8.19), there were no significant effects for Expvs.C1C2 (Est. = .028, $SE = .030$) or for the Expvs.C1C2 by Time interaction (Est. = -.019, $SE = .021$). These results indicate that there were no significant overall effects of the program on peer support scores averaged across T2 and T3. The effects for C1vs.C2 (Est. = .028, $SE = .030$), as well as the C1vs.C2 by Time (Est. = -.027, $SE = .025$) interaction, were also insignificant and demonstrate that there were little differences in peer support scores between the two control groups.

Models 2b and 2c also found non-significant results for Expvs.C2 (Est. = .046, $SE = .049$) and Expvs.C1 (Est. = -.015, $SE = .034$), respectively. Consequently, the experimental groups did not differ significantly from either C1 or C2 in peer support scores. There were also no significant aptitude-treatment interaction effects present in Model 3. Consequently, these results indicate that the peer support program had no impact on perceived levels of peer support for students in the experimental group.
Table 8.13  
**Multilevel Models for Year 10/11 Students on the Peer Support Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.034</td>
<td>.020</td>
<td>.020</td>
<td>.020</td>
<td>.022</td>
</tr>
<tr>
<td>T1PerSup</td>
<td>.488 (.031)</td>
<td>.488 (.031)</td>
<td>.488 (.031)</td>
<td>.461 (.039)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.026 (.025)</td>
<td>-.026 (.025)</td>
<td>-.026 (.025)</td>
<td>-.011 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.028 (.030)</td>
<td>.033 (.030)</td>
<td>.033 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.007 (.034)</td>
<td></td>
<td>-.009 (.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.046 (.049)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.038 (.047)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.019 (.021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.027 (.025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.015 (.034)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>-.042 (.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PerSup x Expvs.C1C2</td>
<td></td>
<td></td>
<td>-.010 (.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PerSup x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td>-.002 (.024)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_e$: between school</td>
<td>.002 (.005)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>variance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_w$: between student</td>
<td>.538 (.050)</td>
<td>.301 (.039)</td>
<td>.301 (.039)</td>
<td>.301 (.039)</td>
<td>.289 (.038)</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_r$: between test</td>
<td>.458 (.032)</td>
<td>.418 (.031)</td>
<td>.418 (.031)</td>
<td>.418 (.031)</td>
<td>.417 (.031)</td>
</tr>
<tr>
<td>occasion Variance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* T1PerSup = Time 1 peer support; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

**Summary of Results for Connectedness**

In summary, the results indicate that the program had a notable effect on both same-sex and opposite-sex relations self-concept. Across the two post-intervention
test occasions, students in the experimental group reported significantly higher same-sex and opposite-sex relations self-concept scores than the average of the control groups, after the effects of the corresponding T1 scores had been controlled. Support was also found for the stability of the effects on the intervention in these domains, with the gains found for the experimental group in comparison to the control groups being maintained over time.

Results from additional analyses testing the effects of the intervention separately for the two control groups were consistent with the results found above and illustrated that (a) the experimental group reported significantly higher same-sex and opposite-sex relations self-concept scores than C2 and that (b) the experimental group reported significantly higher same-sex and opposite-sex relations self-concept scores than C1. Therefore, the consistent pattern of statistically significant effects provides good evidence to suggest that the intervention had a positive and sustained impact on peer relations for the experimental group. The results examining aptitude-treatment interaction effects also indicated that peer leaders with both prior low and high peer relations benefited from taking part in the intervention.

The results also provide some evidence to suggest that the intervention had a positive impact on cooperative teamwork scores. However, the differences between the experimental and control groups were small (only reaching statistical significance for Model 3) and sustained effects between T2 and T3 were limited primarily to those students reported initially high levels of cooperative teamwork. Finally, the results for the peer support scale indicated that the intervention had no effect on perceived levels of peer support for those in the experimental group.
Resourcefulness

Effects on Coping Strategies

A series of analyses were conducted to test the effects of the program on coping strategies. A summary of the results for problem solving strategies is presented in Table 8.14. The results for the baseline components model (Model 1) indicated that most of the variation in problem solving could be explained by differences at the individual student level ($\sigma^2_{\mu_i} = .687, SE = .057$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_{e} = .445, SE = .032$). Calculations of the intra-class correlation indicated that 60.6% of the variance was at the individual student level, 39.2% was at the test occasion level and only 0.2% was at the school level.

Table 8.14 shows that there were no significant effects for Expvs.C1C2 (Est. = .020, SE = .034) or for the Expvs.C1C2 by Time interaction (Est. = .021, SE = .021) in Model 2a. These findings indicate that there were no significant overall effects of the program on problem solving strategies at the post-intervention test occasions. The effects for C1vs.C2, as well as the C1vs.C2 by Time interaction, were also insignificant, which illustrate that there were little differences in problem solving scores between the two control groups.

Models 2b and 2c also found non-significant results for Expvs.C2 and Expvs.C1, respectively. These findings demonstrate that the experimental groups did not differ significantly from either C1 or C2. In addition, there were no significant aptitude-treatment interaction effects present in Model 3. Thus, these results indicate that the peer support program was not successful in enhancing the problem solving strategies of students in the experimental group.

A summary of the results for the support seeking scale is presented in Table 8.15. The results for Model 1 demonstrated that there was significant variance at the individual student ($\sigma^2_{\mu_i} = .594, SE = .040$) and test occasion level ($\sigma^2_{e} = .343, SE = .019$). There was little variation between the schools ($\sigma^2_{\nu} = .010, SE = .011$). For this outcome, 62.7% of the variance was at the individual student level, 36.2% was at the test occasion level and 1.1% was at the school level.
Table 8.14

*Multilevel Models for Year 10/11 Students on the Problem Solving Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2a</th>
<th>Model 2b</th>
<th>Model 2c</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.001</td>
<td>.029</td>
<td>.029</td>
<td>.029</td>
<td>.027</td>
</tr>
<tr>
<td>T1PrbSlv</td>
<td>.523 (.035)</td>
<td>.523 (.035)</td>
<td>.523 (.035)</td>
<td>.514 (.040)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.037 (.025)</td>
<td>.037 (.025)</td>
<td>.037 (.025)</td>
<td>.026 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.020 (.034)</td>
<td></td>
<td></td>
<td>.017 (.034)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>- .019 (.039)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>.039 (.055)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.020 (.053)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td></td>
<td>.021 (.021)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td></td>
<td>.012 (.025)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>.025 (.035)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>.037 (.033)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PrbSlv x Expvs.C1C2</td>
<td></td>
<td></td>
<td>.006 (.033)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1PrbSlv x Expvs.C1C2 x</td>
<td></td>
<td></td>
<td>-.002 (.021)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\text{var}} ): between school variance</td>
<td>.002 (.005)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>( \sigma^2_{\text{var}} ): between student variance</td>
<td>.687 (.057)</td>
<td>.446 (.046)</td>
<td>.446 (.046)</td>
<td>.446 (.046)</td>
<td>.441 (.046)</td>
</tr>
<tr>
<td>( \sigma^2_{\text{var}} ): between test occasion variance</td>
<td>.445 (.032)</td>
<td>.403 (.031)</td>
<td>.403 (.031)</td>
<td>.403 (.031)</td>
<td>.406 (.031)</td>
</tr>
</tbody>
</table>

**Note.** T1PrbSlv = Time 1 problem solving; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

For support seeking (see Table 8.15), Model 2a showed that no significant effects for Expvs.C1C2 (Est. = .035, SE = .028) or for the Expvs.C1C2 by Time interaction (Est. = -.015, SE = .019) in Model 2a. Thus, there were no significant overall effects of the program on support seeking strategies across T2 and T3. The
effects for C1vs.C2, as well as the C1vs.C2 by Time interaction, were also not significant, illustrating that there were little differences in support seeking scores between the two control groups.

Table 8.15

*Multilevel Models for Year 10/11 Students on the Support Seeking Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.006</td>
<td>.062</td>
<td>.062</td>
<td>.062</td>
<td>.062</td>
</tr>
<tr>
<td>T1SupSek</td>
<td>.540 (.029)</td>
<td>.540 (.029)</td>
<td>.540 (.029)</td>
<td>.539 (.035)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.004 (.024)</td>
<td>.004 (.024)</td>
<td>.004 (.024)</td>
<td>.022 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.035 (.028)</td>
<td></td>
<td></td>
<td>.036 (.029)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.011 (.032)</td>
<td></td>
<td></td>
<td>.047 (.046)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>.047 (.046)</td>
<td></td>
<td>.058 (.044)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.015 (.019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.031 (.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.007 (.032)</td>
<td></td>
<td></td>
<td>.038 (.030)</td>
<td>.014 (.029)</td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>.038 (.030)</td>
<td></td>
<td></td>
<td>.031 (.020)</td>
</tr>
<tr>
<td>T1SupSek x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SupSek x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\varphi} ): between school variance</td>
<td>.015 (.016)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>( \sigma^2_{\varphi} ): between student Variance</td>
<td>.563 (.047)</td>
<td>.265 (.034)</td>
<td>.265 (.034)</td>
<td>.265 (.034)</td>
<td>.271 (.034)</td>
</tr>
<tr>
<td>( \sigma^2_{\epsilon} ): between test occasion Variance</td>
<td>.365 (.026)</td>
<td>.353 (.027)</td>
<td>.353 (.027)</td>
<td>.353 (.027)</td>
<td>.346 (.026)</td>
</tr>
</tbody>
</table>

*Note.* T1SupSek = Time 1 support seeking; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
In addition, Models 2b and 2c also found non-significant results for Expvs.C2 and Expvs.C1, respectively. Consequently, the experimental groups did not differ significantly from either C1 or C2 on the support seeking scale. In sum, the results from Models 2a through 2c suggest that the peer support program was not successful in enhancing the support seeking strategies of students in the experimental group. There were also no significant aptitude-treatment interaction effects present in Model 3.

For problem avoidance (see Table 8.16), the results for the baseline model indicated that there was significant variance at the individual student ($\sigma^2_i = .676$, $SE = .062$) and test occasion level ($\sigma^2_e = .543$, $SE = .039$). There was no variation between the three schools ($\sigma^2_s = .000$, $SE = .000$). Calculation of the intra-class correlation indicates that 55.5% of the variance was at the individual student level and 44.5% was at the test occasion level.

For Model 2a (see table 8.16), there were no significant effects for Expvs.C1C2 (Est. = .020, $SE = .034$) or for the Expvs.C1C2 by Time interaction (Est. = .021, $SE = .021$). These findings indicate that there were no overall significant effects of the program on problem avoidance scores averaged across T2 and T3. In addition, the effects for C1vs.C2, as well as the C1vs.C2 by Time interaction, were non-significant, illustrating that there were no sizable differences in problem avoidance scores for the two control groups.

The results for Model 2b demonstrate that the experimental group reported lower problem avoidance scores across T2 and T3 than C2, after controlling for the effects of the T1 variable. However, the differences between the experimental group and C2 were not significant (Est. = -.096, $SE = .056$). Similarly, the results for Model 2c exhibited lower problem avoidance scores for the experimental group compared with C1. However, again these differences were non-significant (Est. = .056, $SE = .053$). The results for Model 3 (see Table 8.16) found that no significant aptitude-treatment interaction effects were present for the problem avoidance scale.
Table 8.16  
*Multilevel Models for Year 10/11 Students on the Problem Avoidance Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.149</td>
<td>.119</td>
<td>.119</td>
<td>.119</td>
<td>.120</td>
</tr>
<tr>
<td>T1Avoid</td>
<td>.546 (.036)</td>
<td>.546 (.036)</td>
<td>.546 (.036)</td>
<td>.545 (.041)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.039 (.029)</td>
<td>-.039 (.029)</td>
<td>-.039 (.029)</td>
<td>-.039 (.026)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>-.051 (.034)</td>
<td></td>
<td>-.044 (.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.040 (.039)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>-.096 (.056)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td>-.056 (.053)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.014 (.024)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.057 (.029)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.050 (.039)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>-.007 (.037)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Avoid x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.044 (.034)</td>
</tr>
<tr>
<td>T1Avoid x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.008 (.024)</td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\omega} ): between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>( \sigma^2_{\omega} ): between student variance</td>
<td>.676 (.062)</td>
<td>.381 (.050)</td>
<td>.381 (.050)</td>
<td>.381 (.050)</td>
<td>.358 (.049)</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\epsilon} ): between test occasion variance</td>
<td>.543 (.039)</td>
<td>.528 (.040)</td>
<td>.528 (.040)</td>
<td>.528 (.040)</td>
<td>.534 (.040)</td>
</tr>
</tbody>
</table>

*Note.* T1Avoid = Time 1 problem avoidance; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

**Effects on Open Thinking**

The results from models testing the effects of the program on open thinking are presented in Table 8.17. Results from the variance components model (see Model 1) showed that there were comparable amounts of variance at the individual student
level ($\sigma_{\omega}^2 = .536, SE = .051$) and the test occasion level ($\sigma_{\epsilon}^2 = .505, SE = .035$). Variances at both of these levels were significant. On the other hand, there was no variance between schools ($\sigma_{\omega}^2 = .000, SE = .000$). Calculation of the intra-class correlation demonstrated that 51.5% of the variance was at the individual student level and 48.5% was at the test occasion level.

The results for Model 2a showed that the effects for Expvs.C1C2 (Est. = .064, $SE = .032$) was marginally significant. The positive direction of the parameter estimate indicates that students in the experimental group reported significantly higher open thinking scores than students in the control groups, after controlling for the effects of T1 scores. Furthermore, the Expvs.C1C2 by time interaction was not significant (Est. = -.015, $SE = .021$), demonstrating that the positive effects of the intervention on opposite-sex relations self-concept were maintained over time. The effects for C1vs.C2, as well as the C1vs.C2 by Time interaction, were also non-significant, indicating that there were little differences in open thinking scores between the two control groups.

In Model 2b the effects for Expvs.C2 were not significant (Est. = .073, $SE = .053$) and reveal that there were no sizable differences between the experimental group and C2. Alternatively, the results for Model 2c show that the results for Expvs.C1 were significant (Est. = .120, $SE = .051$). These findings demonstrate that the experimental group reported significantly higher open thinking scores than C1 across T2 and T3. Furthermore, the parameter estimate (and standard error) for Expvs.C1C2 x Time was not significant (Est. = -.026, $SE = .033$), illustrating that the differences between the experimental group and C1 were maintained over time. Thus, the results from Models 2b and 2c indicate that the experimental group reported significantly higher open thinking scores than C1 following the intervention, but their scores were not significantly different from C2. Finally, the results for Model 3 indicate that there were no significant aptitude-treatment interaction effects present for the open thinking scale.
### Table 8.17

**Multilevel Models for Year 10/11 Students on the Open Thinking Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.101</td>
<td>-.062</td>
<td>-.062</td>
<td>-.062</td>
<td>-.046</td>
</tr>
<tr>
<td>T1OpnThnk</td>
<td><strong>.409 (.035)</strong></td>
<td><strong>.409 (.035)</strong></td>
<td><strong>.409 (.035)</strong></td>
<td><strong>.372 (.042)</strong></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>-.026 (.025)</td>
<td>-.026 (.025)</td>
<td>-.026 (.025)</td>
<td>-.026 (.025)</td>
<td>-.014 (.023)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td><strong>.064 (.032)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.047 (.037)</td>
<td>.073 (.053)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.120 (.051)</td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.015 (.021)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>-.008 (.025)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.018 (.034)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>-.026 (.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1OpnThnk x Expvs.C1C2</td>
<td></td>
<td></td>
<td>-.067 (.036)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1OpnThnk x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td>-.021 (.022)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{ij}$ between school variance</td>
<td>.536 (.051)</td>
<td>.419 (.044)</td>
<td>.419 (.044)</td>
<td>.419 (.044)</td>
<td>.418 (.044)</td>
</tr>
<tr>
<td>$\sigma^2_{ij}$ between student variance</td>
<td>.505 (.035)</td>
<td>.422 (.031)</td>
<td>.422 (.031)</td>
<td>.422 (.031)</td>
<td>.418 (.031)</td>
</tr>
</tbody>
</table>

**Note.** T1OpnThnk = Time 1 open thinking; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.

### Effects on Coping with Change

A summary of the results for the coping with change scale are presented in Table 8.18. The baseline components model for coping with change (Model 1) detected comparable and significant variance between individual students ($\sigma^2_{ij}$ =
.473, $SE = .045$) and test occasions ($\sigma^2_\tau: = .453$, $SE = .031$). The intercepts of the different schools did not differ significantly from one another ($\sigma^2_\phi: = .004$, $SE = .006$). Calculation of the intra-class correlation indicated that 50.9% of the variance was at the individual student level, 48.7% was at the test occasion level, and only 0.4% was at the school level.

Table 8.18

*Multilevel Models for Year 10/11 Students on the Coping with Change Scale*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.007</td>
<td>.004</td>
<td>.004</td>
<td>.004</td>
<td>.009</td>
</tr>
<tr>
<td>T1CpeChg</td>
<td>.456 (.031)</td>
<td>.456 (.031)</td>
<td>.456 (.031)</td>
<td>.438 (.039)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.003 (.025)</td>
<td>.003 (.025)</td>
<td>.003 (.025)</td>
<td>-.008 (.022)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.026 (.029)</td>
<td>.026 (.029)</td>
<td>.030 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.004 (.034)</td>
<td>.037 (.048)</td>
<td>.000 (.033)</td>
<td>.040 (.046)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.011 (.020)</td>
<td>.011 (.020)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.017 (.024)</td>
<td>.017 (.024)</td>
<td></td>
<td></td>
<td>.025 (.032)</td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.008 (.034)</td>
<td>.008 (.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>.008 (.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1CpeChg x Expvs.C1C2</td>
<td>.024 (.034)</td>
<td>.024 (.034)</td>
<td></td>
<td></td>
<td>.024 (.034)</td>
</tr>
<tr>
<td>T1CpeChg x Expvs.C1C2 x Time</td>
<td>.010 (.023)</td>
<td>.010 (.023)</td>
<td></td>
<td></td>
<td>.010 (.023)</td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_\tau$: between school variance</td>
<td>.004 (.006)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_\phi$: between student variance</td>
<td>.473 (.045)</td>
<td>.290 (.037)</td>
<td>.290 (.037)</td>
<td>.290 (.037)</td>
<td>.290 (.037)</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td>.421 (.031)</td>
<td>.421 (.031)</td>
<td>.421 (.031)</td>
<td>.420 (.031)</td>
</tr>
<tr>
<td>$\sigma^2_\tau$: between test occasion variance</td>
<td>.453 (.031)</td>
<td>.421 (.031)</td>
<td>.421 (.031)</td>
<td>.421 (.031)</td>
<td>.420 (.031)</td>
</tr>
</tbody>
</table>

*Note.* T1CpeChg = Time 1 coping with change; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Although the parameter estimates in Model 2a were positive, there were no significant effects for Expvs.C1C2 (Est. = .026, SE = .029) or for the Expvs.C1C2 by Time interaction (Est. = .011, SE = .020). These findings indicate that there were no significant overall effects of the program on coping with change across T2 and T3. The effects for C1vs.C2 (Est. = .004, SE = .034), as well as the C1vs.C2 by Time interaction (Est. = .017, SE = .024), were also not significant, which illustrate that there was minimal difference in coping with change scores between the two control groups.

Models 3 and 4 also found non-significant results for Exp.vsC2 (Est. = .037, SE = .048) and Expvs.C1 (Est. = .040, SE = .046), respectively. These findings demonstrate that the experimental groups did not differ significantly from either C1 or C2. In addition, there were no significant aptitude-treatment interaction effects present in Model 3.

**Effects on Time Efficiency**

The results from models used to test the effects of the program on time efficiency scores are presented in Table 8.19. The results for Model 1 demonstrate that there was significant variance at the individual student ($\sigma^2_\epsilon = .593, SE = .049$) and test occasion level ($\sigma^2_\tau = .410, SE = .028$). There was little variation between the schools ($\sigma^2_p = .005, SE = .007$). For this scale, 58.8% of the variance was at the individual student level, 40.7% was at the test occasion level and only 0.5% was at the school level.

In Model 2a (see Table 8.19), there were no significant effects for Expvs.C1C2 (Est. = .018, SE = .031) or for the Expvs.C1C2 by Time interaction (Est. = .015, SE = .020). These results indicate that there were no significant overall effects of the program on time efficiency scores across T2 and T3. The effects for C1vs.C2 (Est. = .037, SE = .035), as well as the C1vs.C2 by Time interaction (Est. = .015, SE = .020), were also non-significant and demonstrate that there was minimal difference in time efficiency scores between the two control groups.
Models 2b and 2c found non-significant results for Exp.vsC2 and Expvs.C1, respectively. Consequently, the experimental groups did not differ significantly from either C1 or C2. Finally, there were no significant aptitude-treatment interaction effects present in Model 3.

Table 8.19

Multilevel Models for Year 10/11 Students on the Time Efficiency Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.038</td>
<td>.075</td>
<td>.075</td>
<td>.075</td>
<td>.072</td>
</tr>
<tr>
<td>T1CpeChg</td>
<td>.494 (.032)</td>
<td>.494 (.032)</td>
<td>.494 (.032)</td>
<td>.490 (.039)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.044 (.024)</td>
<td>.044 (.024)</td>
<td>.044 (.024)</td>
<td>.032 (.021)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.018 (.031)</td>
<td></td>
<td></td>
<td>.013 (.031)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.037 (.035)</td>
<td></td>
<td></td>
<td>.033 (.035)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>.008 (.050)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.045 (.048)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.015 (.020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.016 (.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>.015 (.032)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td></td>
<td>.031 (.031)</td>
<td></td>
</tr>
<tr>
<td>T1TmeEfc x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.024 (.033)</td>
</tr>
<tr>
<td>T1CpeChg x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.012 (.021)</td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_{\mid} ): between school variance</td>
<td>.005 (.007)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>( \sigma^2_{\parallel} ): between student variance</td>
<td>.593 (.049)</td>
<td>.374 (.039)</td>
<td>.374 (.039)</td>
<td>.374 (.039)</td>
<td>.375 (.039)</td>
</tr>
<tr>
<td>( \sigma^2_{\odot} ): between test occasion variance</td>
<td>.410 (.028)</td>
<td>.376 (.028)</td>
<td>.376 (.028)</td>
<td>.376 (.028)</td>
<td>.369 (.027)</td>
</tr>
</tbody>
</table>

*Note.* T1TmeEfc = Time 1 time efficiency; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
**Effects on Stress Management**

A summary of the results from models testing the effects of the peer support program on stress management can be seen in Table 7.18. The findings for the baseline components model (Model 1) indicates that there was significant variance at the individual student ($\sigma^2_v = .508, SE = .048$) and test occasion level ($\sigma^2_v = .461, SE = .032$). However, the results show that there was no variation between schools ($\sigma^2_v = .000, SE = .000$). Calculation of the intra-class correlations indicate that 52.4% of the variance was at the individual student level and 47.6% was at the test occasion level.

Model 2a for stress management (see Table 8.20) found no significant effects for Expvs.C1C2 (Est. = -.005, SE = .029) or for the Expvs.C1C2 by Time interaction (Est. = -.022, SE = .020). Thus, there were no significant overall effects of the program on stress management across T2 and T3. The effects for C1vs.C2 (Est. = .044, SE = .034), as well as the C1vs.C2 by Time interaction (Est. = .009, SE = .024) which were also insignificant, illustrating that there was little difference in stress management scores between the two control groups.

Models 3 and 4 also found non-significant results for Exp.vsC2 (Est = -.030, SE = .048) and Expvs.C1 (Est = -.029, SE = .032), respectively. Consequently, the experimental groups did not differ significantly from either C1 or C2 in stress management scores. There were also no significant aptitude-treatment interaction effects present in Model 3. Therefore, the results suggest that the peer support program was not successful in enhancing the support seeking strategies of students in the experimental group.
### Table 8.20

**Multilevel Models for Year 10/11 Students on the Stress Management Scale**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.094</td>
<td>.085</td>
<td>.085</td>
<td>.085</td>
<td>.091</td>
</tr>
<tr>
<td>T1StrsMg</td>
<td></td>
<td>.516 (.031)</td>
<td>.516 (.031)</td>
<td>.516 (.031)</td>
<td>.502 (.038)</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td>.040 (.025)</td>
<td>.040 (.025)</td>
<td>.040 (.025)</td>
<td>.053 (.022)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td></td>
<td>-.005 (.029)</td>
<td></td>
<td>.001 (.030)</td>
<td></td>
</tr>
<tr>
<td>C1 vs. C2</td>
<td></td>
<td>.044 (.034)</td>
<td></td>
<td>.041 (.033)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>-.030 (.048)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.014 (.046)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td></td>
<td>-.022 (.020)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1 vs. C2 x Time</td>
<td></td>
<td>.009 (.024)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>-.038 (.034)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td>-.029 (.032)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1StrsMg x Expvs.C1C2</td>
<td></td>
<td>-.016 (.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1StrsMg x Expvs.C1C2 x Time</td>
<td></td>
<td>-.016 (.022)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma^2_\nu ): between school variance</td>
<td>( .000 (.000) )</td>
<td>( .000 (.000) )</td>
<td>( .000 (.000) )</td>
<td>( .000 (.000) )</td>
<td>( .000 (.000) )</td>
</tr>
<tr>
<td>( \sigma^2_\omega ): between student variance</td>
<td>( .508 (.048) )</td>
<td>( .292 (.037) )</td>
<td>( .292 (.037) )</td>
<td>( .292 (.037) )</td>
<td>( .291 (.037) )</td>
</tr>
<tr>
<td>( \sigma^2_\epsilon ): between test occasion variance</td>
<td>( .461 (.032) )</td>
<td>( .418 (.030) )</td>
<td>( .418 (.030) )</td>
<td>( .418 (.030) )</td>
<td>( .418 (.030) )</td>
</tr>
</tbody>
</table>

*Note. T1StrsMg = Time 1 stress management; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.*

### Summary of Results for Resourcefulness

The results provide limited support for the enhancement of open thinking for the peer support leaders. Although the leaders reported significantly higher open thinking scores than C1 following the intervention, their scores were not significantly
different from C2. The results also indicated that the intervention did not produce significant changes in coping strategies, coping with change, time efficiency and stress management for students in the experimental group. Overall, therefore, the results provide very little evidence to suggest that the intervention had an impact of student resourcefulness for those who served as peer support leaders.
Sense of Possibility

Effects on Self-Efficacy

A summary of the results for self-efficacy is presented in Table 8.21. The results for the baseline components model (Model 1) indicated that most of the variation in self-efficacy scores was explained by differences at the individual student level ($\sigma^2_w = .494, SE = .042$). A considerable portion of the variance could also be explained by differences between test occasions ($\sigma^2_e = .353, SE = .024$). Calculations of the intra-class correlation indicated that 57.7% of the variance was at the individual student level, 41.2% was at the test occasion level and only 1.0% was at the school level.

Table 8.21 shows that there were no significant effects for Expvs.C1C2 (Est. = .026, $SE = .027$) or for the Expvs.C1C2 by Time interaction (Est. = -.001, $SE = .019$) in Model 2a. These findings indicate that there were no significant overall effects of the program on self-efficacy scores across the post-intervention test occasions. The effects for C1vs.C2, as well as the C1vs.C2 by Time interaction, were also not significant, which illustrates that there was minimal difference in self-efficacy scores between the two control groups.

Models 2b and 2c also found non-significant results for Exp.vsC2 and Expvs.C1, respectively. These findings demonstrate that the experimental groups did not differ significantly from either C1 or C2. In addition, there were no significant aptitude-treatment interaction effects present in Model 3. In sum, these results indicate that the peer support program was not successful in enhancing the self-efficacy scores of students in the experimental group.
Table 8.21

Multilevel Models for Year 10/11 Students on the Self-Efficacy Scale

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.079</td>
<td>.089</td>
<td>.089</td>
<td>.089</td>
<td>.089</td>
</tr>
<tr>
<td>T1SIfEfc</td>
<td>.483 (.029)</td>
<td>.483 (.029)</td>
<td>.483 (.029)</td>
<td>.481 (.035)</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.021 (.023)</td>
<td>.021 (.023)</td>
<td>.021 (.023)</td>
<td>.016 (.020)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.026 (.027)</td>
<td>.026 (.027)</td>
<td>.027 (.027)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>.036 (.031)</td>
<td>.032 (.031)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td>.021 (.045)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td></td>
<td>.058 (.043)</td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.001 (.019)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td></td>
<td>.019 (.023)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.011 (.031)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>.008 (.030)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1SIfEfc x Expvs.C1C2</td>
<td></td>
<td></td>
<td></td>
<td>.004 (.030)</td>
<td></td>
</tr>
<tr>
<td>T1SIfEfc x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>-.015 (.021)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\gamma}$: between school variance</td>
<td>.009 (.010)</td>
<td>.001 (.003)</td>
<td>.001 (.003)</td>
<td>.001 (.003)</td>
<td>.001 (.003)</td>
</tr>
<tr>
<td>$\sigma^2_{\gamma}$: between student variance</td>
<td>.494 (.042)</td>
<td>.256 (.033)</td>
<td>.256 (.033)</td>
<td>.256 (.033)</td>
<td>.258 (.032)</td>
</tr>
<tr>
<td>$\sigma^2_{\gamma}$: between test occasion variance</td>
<td>.353 (.024)</td>
<td>.365 (.027)</td>
<td>.365 (.027)</td>
<td>.365 (.027)</td>
<td>.358 (.026)</td>
</tr>
</tbody>
</table>

Note. T1SIfEfc = Time 1 self-efficacy; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Effects on Remaining Outcomes

The effects of the program on all other variables were also examined through multilevel procedures. A summary of the results for these variables is presented in Table 8.22 (More comprehensive results can be found in Appendix G-2).

The results of the baseline model (Model 1) for each of these variables indicates that most of the variance could be explained by differences at the individual student level. A considerable portion of the variance could also be explained by differences between test occasions. The variance between individual students and test occasions was significant for all variables. However, there was very little variation between schools on any of the variables, with none of the school effects attaining significance.

In Model 2a, significant Expvs.C1C2 effects were found for physical appearance (Est. = .064, SE = .029), social effectiveness (Est. = .075, SE = .031), quality seeking (Est. = .081, SE = .032), and enjoyment of school (Est. = .068, SE = .030). For each of these scales, the direction of the parameter estimate was positive, which indicates that students in the experimental group reported higher scores on these scales than students in the control groups (averaged across T2 and T3), after the effects of the corresponding T1 scores were controlled. Furthermore, the Expvs.C1C2 by Time interaction for each of these scales was non-significant (physical appearance: Est. = -.026, SE = .017; social effectiveness: Est. = -.007, SE = .022; quality seeking: Est. = -.017, SE = .022; and enjoyment of school: Est. = -.005, SE = .020), demonstrating that the positive effects of the intervention on these domains were maintained over time. The results from Model 2a for each of these four scales also indicated that there were no significant differences between the control groups across T2 and T3.

For Model 2b, significant Expvs.C2 effects were found for physical appearance (Est. = .102, SE = .047), social effectiveness (Est. = .120, SE = .050), quality seeking (Est. = .123, SE = .053), and enjoyment of school (Est. = .114, SE = .049). These findings illustrate that the experimental group reported higher scores in these domains than C2, after the effects of corresponding T1 scores were taken into account. No significant effects of Expvs.C2 were found on any of the other variables.
Model 2c found the presence of significant results for Expvs.C1 found for physical appearance (Est. = .090, SE = .045), social effectiveness (Est. = .105, SE = .048), and quality seeking (Est. = .121, SE = .051). The results indicated the experimental group reported higher scores in these domains than C1, after the effects of corresponding T1 scores were taken into account. However, the effects for Expvs.C1 did not reach significance for the enjoyment of school scale (Est. = .090), SE = .047). No significant effects of Expvs.C1 were found on any of the other variables.

In summary, the consistent pattern of results for physical appearance, social effectiveness and quality seeking has provided good evidence to suggest that the intervention had a positive and sustained effect in each of these domains for the experimental group. Furthermore, no aptitude-treatment interaction effects were present for these three scales (see Model 3), suggesting that the intervention was beneficial to peer leaders with both prior low and high levels in these domains. The results also suggest that the intervention may have had an impact on enjoyment of school for the experimental group. However, the results were not as consistent as those found for the three scales noted above, with overall significant differences found between the experimental group and average of the two control groups, as well as between the experimental group and C2, but no significant differences were found between the experimental group and C1.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Physical Ability</th>
<th>Physical Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.035</td>
<td>-.032</td>
</tr>
<tr>
<td>T1Variable</td>
<td>.705 (.026)</td>
<td>.705 (.026)</td>
</tr>
<tr>
<td>Time</td>
<td>-.013 (.020)</td>
<td>-.013 (.020)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.023 (.025)</td>
<td>.019 (.025)</td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.044 (.029)</td>
<td>-.046 (.029)</td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.057 (.042)</td>
<td>.013 (.040)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.010 (.017)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.007 (.020)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.012 (.028)</td>
<td>.012 (.028)</td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.019 (.026)</td>
<td>.019 (.026)</td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2</td>
<td>.006 (.003)</td>
<td>.006 (.003)</td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2 x Time</td>
<td>.270 (.019)</td>
<td>.276 (.020)</td>
</tr>
</tbody>
</table>

**Note.** T1Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est. = Positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; Expvs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Table 8.22 continued...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parent Relations</th>
<th>Emotional Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.151</td>
<td>-.121</td>
</tr>
<tr>
<td>T1Variable</td>
<td>.632 (.030)</td>
<td>.632 (.030)</td>
</tr>
<tr>
<td>Time</td>
<td>-.013 (.024)</td>
<td>-.013 (.024)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.036 (.028)</td>
<td>.031 (.028)</td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.020 (.032)</td>
<td>-.023 (.032)</td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.064 (.046)</td>
<td>.044 (.044)</td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.006 (.019)</td>
<td>.004 (.020)</td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.026 (.023)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-.022 (.032)</td>
<td>.018 (.034)</td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{between}$</td>
<td>.000 (.000)</td>
<td>.001 (.002)</td>
</tr>
<tr>
<td>$\sigma^2_{student}$</td>
<td>.642 (.053)</td>
<td>.270 (.034)</td>
</tr>
<tr>
<td>$\sigma^2_{test occasion}$</td>
<td>.430 (.030)</td>
<td>.375 (.027)</td>
</tr>
</tbody>
</table>

Note. T1Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1vs.C2 Est.: positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Table 8.22 continued...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Math</th>
<th>Social Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.074</td>
<td>-.105</td>
</tr>
<tr>
<td>T1 Variable</td>
<td>.761 (.027)</td>
<td>.761 (.027)</td>
</tr>
<tr>
<td>Time</td>
<td>.021 (.021)</td>
<td>.021 (.021)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.002 (.026)</td>
<td>-.007 (.026)</td>
</tr>
<tr>
<td>C1 vs. C2</td>
<td>.052 (.029)</td>
<td>.048 (.029)</td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>-.023 (.042)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td>.029 (.040)</td>
<td>.105 (.048)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.029 (.017)</td>
<td>-.007 (.022)</td>
</tr>
<tr>
<td>C1 vs. C2 x Time</td>
<td>.030 (.020)</td>
<td>.005 (.026)</td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.029 (.028)</td>
<td>-.013 (.036)</td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>.059 (.027)</td>
<td>-.008 (.035)</td>
</tr>
<tr>
<td>T1 Variable x Expvs.C1C2</td>
<td></td>
<td>.029 (.027)</td>
</tr>
<tr>
<td>T1 Variable x Expvs.C1C2 x Time</td>
<td></td>
<td>-.009 (.018)</td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{s1}$: between school variance</td>
<td>.004 (.007)</td>
<td>.001 (.002)</td>
</tr>
<tr>
<td>$\sigma^2_{s2}$: between student variance</td>
<td>.779 (.054)</td>
<td>.244 (.028)</td>
</tr>
<tr>
<td>$\sigma^2_{t1}$: between test occasion variance</td>
<td>.299 (.021)</td>
<td>.283 (.021)</td>
</tr>
</tbody>
</table>

Note. T1 Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: positive values indicate higher values for the experimental group; C1 vs. C2 Est.: positive values indicate higher values for control group 2; ExpvsC2 vs. C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Table 8.22 continued...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Quality Seeking</th>
<th>Active Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2a</td>
</tr>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.252 (-0.213)</td>
<td>-0.213 (-0.213)</td>
</tr>
<tr>
<td>T1Variable</td>
<td>0.542 (0.034)</td>
<td>0.542 (0.034)</td>
</tr>
<tr>
<td>Time</td>
<td>-0.017 (0.027)</td>
<td>-0.017 (0.027)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>0.081 (0.032)</td>
<td>0.083 (0.032)</td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-0.002 (0.037)</td>
<td>-0.006 (0.037)</td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-0.017 (0.022)</td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>0.015 (0.027)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>-0.033 (0.037)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>-0.017 (0.035)</td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\nu}$ between</td>
<td>0.000 (0.000)</td>
<td>0.000 (0.000)</td>
</tr>
<tr>
<td>school variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\nu}$ between</td>
<td>0.671 (0.059)</td>
<td>0.371 (0.046)</td>
</tr>
<tr>
<td>student variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\nu}$ between</td>
<td>0.537 (0.037)</td>
<td>0.502 (0.037)</td>
</tr>
<tr>
<td>test occasion variance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. T1Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.; positive values indicate higher values for the experimental group; C1vs.C2 Est.; positive values indicate higher values for control group 2; Expvs.C1 Est.: positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.; positive values indicate higher values for the experimental group; Expvs.C1 Est.: positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Table 8.22 continued...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Overall Effectiveness</th>
<th>Parent Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.727 (.032)</td>
<td>-.281 (.032)</td>
</tr>
<tr>
<td>T1 Variable</td>
<td>.542 (.032)</td>
<td>.542 (.032)</td>
</tr>
<tr>
<td>Time</td>
<td>.043 (.023)</td>
<td>.043 (.023)</td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.057 (.030)</td>
<td>.077 (.035)</td>
</tr>
<tr>
<td>C1 vs. C2</td>
<td>-.009 (.034)</td>
<td>-.053 (.043)</td>
</tr>
<tr>
<td>Expvs.C2</td>
<td>.090 (.049)</td>
<td>-.053 (.043)</td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td>.082 (.047)</td>
</tr>
<tr>
<td>Interactions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>.000 (.019)</td>
<td>-.008 (.023)</td>
</tr>
<tr>
<td>C1 vs. C2 x Time</td>
<td>-.006 (.023)</td>
<td>.052 (.027)</td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td>.003 (.031)</td>
<td>-.038 (.038)</td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td>-.003 (.030)</td>
<td>.015 (.036)</td>
</tr>
<tr>
<td>T1 Variable x Expvs.C1C2</td>
<td>.039 (.036)</td>
<td>.096 (.041)</td>
</tr>
<tr>
<td>T1 Variable x Expvs.C1C2 x Time</td>
<td>.001 (.019)</td>
<td>.020 (.032)</td>
</tr>
<tr>
<td>Random</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\nu}$, between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_{\mu}$, between student variance</td>
<td>.593 (.050)</td>
<td>.350 (.037)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$, between test occasion variance</td>
<td>.420 (.029)</td>
<td>.358 (.026)</td>
</tr>
</tbody>
</table>

Note. T1 Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: Positive values indicate higher values for the experimental group; C1 vs. C2 Est.: Positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: Positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: Positive values indicate higher values for the experimental group; Expvs.C1 Est.: Positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Table 8.22 continued...

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1 Est.</th>
<th>Model 2a Est.</th>
<th>Model 2b Est.</th>
<th>Model 2c Est.</th>
<th>Model 3 Est.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-.090</td>
<td>-.066</td>
<td>-.066</td>
<td>-.066</td>
<td>-.036</td>
</tr>
<tr>
<td>T1Variable</td>
<td>(.626 (.033))</td>
<td>(.626 (.033))</td>
<td>(.626 (.033))</td>
<td>(.600 (.040))</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.031 (.024)</td>
<td>.031 (.024)</td>
<td>.031 (.024)</td>
<td>.024 (.022)</td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2</td>
<td>.068 (.030)</td>
<td></td>
<td>.085 (.032)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2</td>
<td>-.024 (.034)</td>
<td></td>
<td>-.035 (.033)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2</td>
<td></td>
<td></td>
<td>.114 (.049)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1</td>
<td></td>
<td></td>
<td>.090 (.047)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1C2 x Time</td>
<td>-.005 (.020)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1vs.C2 x Time</td>
<td>.058 (.023)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C2 x Time</td>
<td></td>
<td>-.037 (.033)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expvs.C1 x Time</td>
<td></td>
<td></td>
<td>.021 (.031)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2</td>
<td></td>
<td></td>
<td>-.040 (.034)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1Variable x Expvs.C1C2 x Time</td>
<td></td>
<td></td>
<td></td>
<td>-.010 (.021)</td>
<td></td>
</tr>
<tr>
<td><strong>Random</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma^2_{\eta}$: between school variance</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
<td>.000 (.000)</td>
</tr>
<tr>
<td>$\sigma^2_{\epsilon}$: between student variance</td>
<td>.617 (.055)</td>
<td>.239 (.027)</td>
<td>.239 (.027)</td>
<td>.239 (.027)</td>
<td>.239 (.027)</td>
</tr>
<tr>
<td>$\sigma^2_{\omega}$: between test occasion variance</td>
<td>.452 (.031)</td>
<td>.276 (.020)</td>
<td>.276 (.020)</td>
<td>.276 (.020)</td>
<td>.274 (.020)</td>
</tr>
</tbody>
</table>

*Note.* T1Variable = corresponding Time 1 variable; Time = test occasion (T2 and T3); Est. = parameter estimate (Expvs.C1C2 Est.: Positive values indicate higher values for the experimental group; C1vs.C2 Est.: Positive values indicate higher values for control group 2; ExpC2vs.C1 Est.: Positive values indicate higher values for the average of the experimental group and control group 2; Expvs.C2 Est.: Positive values indicate higher values for the experimental group; Expvs.C1 Est.: Positive values indicate higher values for the experimental group). Standard errors are given in parentheses. Values in bold are statistically significant.
Summary

The current chapter has provided a thorough evaluation of the effects of the peer support program on those who served as peer support leaders. The impact of partaking in the intervention on school self-concept, school citizenship, general sense of self, connectedness, resourcefulness, sense of possibility, and other important psychological outcomes were evaluated with a sample of 858 Year 10/11 students from three secondary schools. Participants in the experimental and control groups were tested on three occasions: prior to the commencement of the program, at the completion of the program and again, four months later. The study utilised measurement instruments with strong psychometric properties (see Chapter 6), in addition to highly advanced statistical analyses to evaluate students’ responses (see Chapter 5).

The results clearly demonstrated that the peer support program had a positive impact on leadership ability. Consistent with predictions, peer support leaders reported higher leadership ability over the post-intervention test occasions than the two control groups. Evidence was also found for the maintenance of the positive effects of the intervention on leadership ability over time. Further tests also indicated that leaders with lower prior levels of leadership ability especially benefited from the intervention.

The findings for school citizenship were also positive. Peer support leaders reported lower pro-bully scores, as well as higher pro-victim and honesty/trustworthiness scores, across the post-intervention test occasions. Clear support was also found for the stability of these effects over time. Furthermore, the results provided good evidence to suggest that the intervention had a positive impact on general sense of self for those who served as peer support leaders. The findings showed that, across the post-intervention test occasions, students in the experimental group reported significantly higher self-confidence and global self-esteem scores than the two control groups. Support was also found for the maintenance of the effects on self-confidence and global self-esteem over time.

In addition, the results provided partial support for the capacity of the intervention to enhance student connectedness. Particularly positive results were found for the peer relations self-concept scales. Across the post-intervention test
occasions, peer support leaders reported higher same-sex and opposite-sex relations self-concept than the two control groups. Support was also found for the maintenance of the effects in these domains over time. There was also some indication that the intervention may have had a positive effect on cooperative teamwork scores. However, the differences between the experimental and control groups were only small and sustained effects between T2 and T3 were restricted primarily to those students who were initially high in cooperative teamwork. The results for the peer support scale indicated that the intervention had no significant impact of perceived levels of peer support for those who served as peer support leaders.

The results in the present chapter provided limited evidence for the enhancement of school self-concept, resourcefulness or sense of possibility following the intervention. Scales measuring school self-concept showed that although the peer support leaders reported significantly higher scores than participants in C1 over the post-intervention test occasions, their scores were not significantly different from C2. With regards to resourcefulness, there was some evidence for the enhancement of open thinking for the peer support leaders. While the experimental group reported significantly higher scores than C1 over T2 and T3, there was little difference between the experimental group and C2 following the intervention. The results also indicated that the intervention did not produce significant changes in coping strategies, coping with change, time efficiency and stress management and self-efficacy for students in the experimental group.

Results on additional psychological outcomes suggested that the intervention had a positive and sustained effect on physical appearance, social effectiveness and quality seeking. Peer support leaders reported higher scores in these domains than the two control groups over T2 and T3. There was also some evidence to suggest that the intervention may have had an impact on enjoyment of school. Significant differences were found between the experimental group and C2, but not between the experimental group and C1.
CHAPTER 9

STUDY 4: QUANTITATIVE AND QUALITATIVE STUDENT EVALUATIONS OF THE PROGRAM

Introduction

Over the past decade, researchers in various areas of psychology, especially in the field of program research, have claimed that there are merits in moving beyond the customary practice of choosing either qualitative or quantitative methods and instead combining the two methods within the same study (Berg, 2001; Gill, 1996). A combination of quantitative (questionnaire) and qualitative methods (open-ended written responses and focus groups) were used in Study 4 to provide insight into students’ personal perspectives of the strengths and limitations of the peer support program (see Chapter 4 for a detailed description of the aims and research question for Study 4).

A total of 495 students (410 Year 7 students and 85 peer support leaders) completed the quantitative questionnaire for Study 4. The frequency and percentage of students responses to each of the quantitative questionnaire items were examined using a four-point rating scale. A total of 483 students (408 Year 7 students and 75 peer support leaders) responded to the open-ended questionnaire items. In addition, 163 students participated in focus group discussions. Thematic analysis was used to critically analyse students’ qualitative responses to the open-ended questionnaire and focus group discussions.

This chapter begins by providing background information on the emergence of the combined quantitative-qualitative approach in contemporary research and an overview of the research methods employed in the current study (see Chapter 5 for additional details on the methodology for Study 4). Secondly, the results based on the quantitative questionnaire data are presented, followed by the results from the open-ended questions and focus group discussions, where themes of congruence and dissonance across the data sets are identified.
Historical Background to the Emergence of Mixed Methods Research and Rationale for this Approach in the Current Study

The methodology of psychological research has undergone several dramatic changes over the past thirty years, which has had a significant impact on the way in which researchers currently examine behaviours, programs and social interactions (Tashakkori & Teddlie, 2003). Since the 1970s, "several debates or wars have raged in the social and behavioural sciences regarding the superiority of one or the other of the two major social science paradigms or models" (Tashakkori & Teddlie, 1998, p.3). For many years, there have been arguments between the seemingly incompatible philosophies of positivists versus constructivists, as well as the closely related dichotomies between empiricists versus phenomenologists. Although these dichotomies could be better thought of as describing different ends of a continuum, they do reflect dramatically different views that have influenced the type of methodology employed by researchers (Brannen, 1992; Worthen, 2001). Undoubtedly, the best known methodological battles have been fought between proponents of quantitative versus qualitative research methods. Quantitative methods are largely supported by the positivist or empiricist paradigm, whereas qualitative methods are typically supported by constructivist or phenomenological orientations (Tashakkori & Teddlie, 1998). The jostling between these two methodologies has generally been referred to in literature as the "qualitative-quantitative debate" (e.g., Krantz, 1995; Reichardt & Rallis, 1994; Shadish, 1995).

Parallel to the debates between those of quantitative and qualitative persuasion, however, has been the emergence of a third methodological movement (Tashakkori & Teddlie, 1998) which has called for an end to the "qualitative-quantitative debate" and a rechanneling of efforts for a more integrated methodological approach. Proponents of this view argue that the adoption of a mixed methods approach will often prove more productive than a single line of inquiry (e.g., Berg, 2001; Gill, 1996; King, Keohane & Verba, 1994). They reason that, since each approach is not without its limitations, the use of a combination of quantitative and qualitative methods can neutralise or cancel out some of the disadvantages that the methods have by themselves (Brewer & Hunter, 1989; Greene & Caracelli, 1997; Creswell, Clark, Gutmann & Hanson, 2003). For example, qualitative data can provide insights not available through general quantitative measures (Jick, 1979). As
asserted by Larsson (2001), qualitative data "can be an important addition to an
evaluation, since it is not usually possible to quantitatively measure every pertinent
immediate effect of an intervention" (p. 71).

Over recent years, the use of mixed methods has been growing exponentially
across most areas of psychological research (Tashakkori & Teddlie, 2003). Today,
most appear to view the two approaches as compatible, complementary approaches
(Labuschagne, 2003; Sechrest & Sidani, 1995; Barrett, 1995), and are of the opinion
that "the bitter qualitative-quantitative debate, if not dead, was somehow buried – or
should be" (Worthen, 2001, p. 413). Increasingly, researchers are becoming
dissatisfied with purely quantitative analyses and are incorporating qualitative
analyses to provide a more comprehensive research approach (Strauss & Corbin,
1994).

In recognition of this recent development, the present study (Study 4) utilised
a combination of quantitative and qualitative methods to critically analyse students’
perceptions of the strengths and limitations of the peer support program. For the
present study, quantitative measures were administered to students in order to obtain
their views about the content, process and perceived value of participating in the
program. As emphasised by Labuschagne (2003), the statistics obtained from
quantitative measures have the advantage of making "summaries, comparisons and
generalisation quite easy and precise" (p. 3). However, it was considered that a
qualitative approach could enrich and extend the findings of the present thesis by
allowing students to express their views and experiences without being dictated by
the structure and content of a Likert-type, quantitative approach.

The role of the qualitative research in Study 4 was to illuminate key
quantitative findings found in the present thesis, giving voice and life to the results,
as well as providing an insight into the personal perspectives of participants. As
Patton (1987) asserted, the intention was to "put flesh on the bones of the
quantitative results, bringing the results to life through in-depth elaborations" (p. 38).
The second aim of the qualitative component of Study 4 was to provide insight into
issues that may not have been identified by the quantitative methods. It enabled
students to identify any additional outcomes that may not have been included in the
quantitative survey for Studies 2 and 3 as well as identify additional areas in which
the program could be improved in the future.
Overview of Research Methods for Study 4

Quantitative Methods

A quantitative student evaluation questionnaire was developed for the purposes of the present research to assess students’ views about the content, process and value of the peer support program. Two separate questionnaires were developed: One for the Year 7 students and another for the peer support leaders. The survey for Year 7 was designed to assess students’ perceptions of (a) its content, activities and value; (b) group rapport and cooperation; and (c) merit of their peer support leaders. (See Chapter 5 and Appendix 5A for further details on the instrumentation employed in Study 4). The survey for peer support leaders measured leaders’ perceptions of the program in terms of (a) coordination and management, (b) appropriateness and value for Year 7 students, and (c) benefit for the program for the peer support leaders themselves (see Chapter 5 and Appendix 5A for further details). These surveys were administered to students after the completion of the peer support program at Time 2, Year 2.

Qualitative Methods

Two methods were used to gather qualitative data for the present study, the first through open-ended questionnaire items and the second through focus group discussions. This data was collected after the completion of the peer support program at Time 2 Year 2.

Open-ended questions were included at the end of the quantitative questionnaire so that students could convey their perceptions of the peer support program in their own words. This method was selected as it is considered to be a highly economical way of collecting qualitative data. As Larsson (2001) suggests, this approach ensures the receipt of the opinions of a large number of individuals in a short period of time. The open-ended questions (see Chapter 5) gave Year 7 participants the opportunity to express their views of the benefits of the program, discuss their opinion about the peer support leaders, and identify any limitations of the program. Participating leaders were also invited to identify the ways in which the program was of benefit to the Year 7 students as well as to themselves.
There are, however, several limitations to open-ended questionnaire items; limitations related to the writing skills of respondents, the impossibility of probing or extending responses, and the effort required of the persons completing the questionnaire (Patton, 1987). Given these limitations, a second method was used to gather qualitative information—focus group discussions.

Focus groups have the advantage of allowing the researcher to interact directly with respondents. They provide opportunities for the clarification of responses, for follow-up questions, and for the probing of responses (Stewart & Shamdasani, 1990). Furthermore, the social setting of this method provides a measure of validation of information, since extreme or false views tend to be challenged by others in the group (Larsson, 2001). On completion of the 50 minute test session, students were invited to take part in discussion groups on the strengths and weaknesses of the peer support program. Almost all students indicated that they would be willing to participate. A random selection of 163 students (119 Year 7 students and 44 peer support leaders) was asked to participate.

Content analysis was used to group the qualitative information into a small number of sets of themes or constructs. Separately, two researchers systematically identified themes within the data and assigned them to categories. They began by identifying key words and then systematically searching the responses to find all instances of the words or phrase. Each time the word or phrase was found, they made a copy of it and its immediate context. Themes were identified by physically sorting the examples into piles of similar meaning. The results were then compared and discussed until the generated themes were agreed upon (see Chapter 5 for further information on data analysis procedures for Study 4).
Quantitative Results

Year 7 Evaluations of the Program

Year 7 students' evaluations of the peer support program in relation to each survey item are summarised in Table 9.1. In general, their evaluations of the program were equally divided with half the students giving positive responses and the other half giving negative responses. Almost half of all respondents indicated that the program was valuable to their personal growth and development (Item 4; 48.0% "mostly" to "definitely" true). Furthermore, 27.2% of students reported that the program was "definitely" worth the time taken to do it and 28.6% reported that it was "mostly" worth the time taken to do it (Item 5).

Year 7 evaluations of the program activities and content were also divided, with 33.5% of students reporting that they were "mostly" interesting whilst another 35.5% indicated that they were "mostly" uninteresting (Item 1). Furthermore, responses relating to the activity sheets and exercises of the program tended to be more negative than positive, with 66.9% of students suggesting that they "mostly" or "totally" disagreed with their merit (Item 2). Similarly, most students did not agree that the program was challenging and stimulating (Item 3; 73.4% "mostly" to "totally" false). Nevertheless, in an overall evaluation of the program, over half of all students reported that the program was "definitely" (21.5%) or "mostly" (32.8%) of high quality and value (Item 6).

In summary, approximately half of the Year 7 students indicated that they had personally benefited from the program, with the other half largely disagreeing with its value. The highest proportion of negative responses were found on Item 2, pertaining to the activities and exercises of the program, and Item 3, which concerned the level of challenge and stimulation of the program. These results may be identifying an important limitation of the program in this area and suggest that it may be necessary to revise the activities and exercises so as to make the program more stimulating and challenging for Year 7 students.
Table 9.1
Frequency and Percentage of Year 7 Student Responses to the Quantitative Program Evaluation Questionnaire

<table>
<thead>
<tr>
<th>Item</th>
<th>Definitely or Totally True</th>
<th>Mostly True</th>
<th>Mostly False</th>
<th>Definitely or Totally False</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>N</td>
</tr>
<tr>
<td><strong>Program Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Activities and topics of the program were interesting</td>
<td>57 (14.0)</td>
<td>136 (33.5)</td>
<td>144 (35.5)</td>
<td>69 (17.0)</td>
<td>406</td>
</tr>
<tr>
<td>2. Activity sheets and exercises of the program were excellent</td>
<td>35 (8.6)</td>
<td>99 (24.4)</td>
<td>137 (33.8)</td>
<td>134 (33.1)</td>
<td>405</td>
</tr>
<tr>
<td>3. Program was challenging and stimulating</td>
<td>41 (10.1)</td>
<td>67 (16.5)</td>
<td>148 (36.5)</td>
<td>150 (36.9)</td>
<td>406</td>
</tr>
<tr>
<td>4. Program was valuable for my personal growth and development</td>
<td>68 (16.7)</td>
<td>127 (31.3)</td>
<td>138 (34.0)</td>
<td>73 (18.0)</td>
<td>406</td>
</tr>
<tr>
<td>5. Program was worth the time involved to do it</td>
<td>110 (27.2)</td>
<td>116 (28.6)</td>
<td>98 (24.2)</td>
<td>81 (20.0)</td>
<td>410</td>
</tr>
<tr>
<td>6. Overall, the program was of high quality and value</td>
<td>87 (21.5)</td>
<td>133 (32.8)</td>
<td>97 (24.0)</td>
<td>88 (21.7)</td>
<td>410</td>
</tr>
<tr>
<td><strong>Group Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Group discussions were useful and productive</td>
<td>95 (23.4)</td>
<td>134 (33.0)</td>
<td>101 (24.9)</td>
<td>76 (18.7)</td>
<td>406</td>
</tr>
<tr>
<td>8. Group members cooperated with each other</td>
<td>135 (33.3)</td>
<td>110 (27.2)</td>
<td>92 (22.7)</td>
<td>68 (16.8)</td>
<td>405</td>
</tr>
<tr>
<td>9. Group worked well as a team throughout the program</td>
<td>135 (33.6)</td>
<td>124 (30.8)</td>
<td>86 (21.4)</td>
<td>57 (14.2)</td>
<td>402</td>
</tr>
<tr>
<td>10. I could talk openly and easily within the group</td>
<td>164 (40.5)</td>
<td>100 (24.7)</td>
<td>83 (20.5)</td>
<td>58 (14.3)</td>
<td>405</td>
</tr>
<tr>
<td>11. I felt comfortable and accepted within the group</td>
<td>190 (46.9)</td>
<td>116 (28.6)</td>
<td>63 (15.6)</td>
<td>36 (8.9)</td>
<td>405</td>
</tr>
<tr>
<td>12. I made new friendships during the program</td>
<td>179 (44.1)</td>
<td>106 (26.1)</td>
<td>45 (11.1)</td>
<td>76 (18.7)</td>
<td>404</td>
</tr>
<tr>
<td><strong>Leader Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Leaders gave explanations in a clear and understandable way</td>
<td>221 (53.9)</td>
<td>122 (29.8)</td>
<td>49 (12.0)</td>
<td>18 (4.4)</td>
<td>410</td>
</tr>
<tr>
<td>14. Could talk openly and easily with leaders</td>
<td>208 (50.7)</td>
<td>111 (27.1)</td>
<td>60 (14.6)</td>
<td>31 (7.6)</td>
<td>410</td>
</tr>
<tr>
<td>15. Leaders were friendly</td>
<td>261 (63.7)</td>
<td>100 (24.4)</td>
<td>39 (9.5)</td>
<td>10 (2.4)</td>
<td>410</td>
</tr>
<tr>
<td>16. Leaders set a good example for students to follow</td>
<td>218 (53.2)</td>
<td>121 (29.5)</td>
<td>57 (13.9)</td>
<td>14 (3.4)</td>
<td>410</td>
</tr>
<tr>
<td>17. Leaders were efficient and organised</td>
<td>191 (46.6)</td>
<td>142 (34.6)</td>
<td>51 (12.4)</td>
<td>26 (6.3)</td>
<td>410</td>
</tr>
<tr>
<td>18. Leaders good at managing and controlling the sessions</td>
<td>190 (46.3)</td>
<td>129 (31.5)</td>
<td>65 (15.9)</td>
<td>26 (6.3)</td>
<td>410</td>
</tr>
</tbody>
</table>

*Note. Percentages are given in parentheses.*
Year 7 Evaluations of their Peer Support Group

There was also considerable variation in Year 7 students’ evaluations of their peer support group in terms of group rapport and collaboration on tasks. However, their responses tended to be more positive than negative. Almost half of all respondents felt “totally” comfortable and accepted within their peer support group (Item 11). In addition, 40.5% of students reported that they could “definitely” talk openly and easily within their group (Item 10). The vast majority of students indicated that they made new friendships during the program (Item 12; 70.2% “mostly” to “totally” true) and that their group worked well as a team throughout the program (Item 9; 64.4% “mostly” to “totally” true). Almost 70% of students reported that the group members “totally” or “mostly” cooperated with each other (Item 8) and 56.4% found that the group discussions were useful and productive (Item 7). At the same time, however, approximately one in five students indicated that the group members were “totally” uncooperative (Item 8; 16.8%) and that the group discussions were “definitely” not useful or productive (Item 7).

These results show that the majority of students gave positive evaluations of their peer support group, particularly in terms of the connections and friendships they had formed with one another. Most students felt accepted within the group and could talk openly with other group members. Moreover, the majority of students indicated that they had made new friendships during the program. The highest proportion of negative responses, however, were found for Item 7, regarding the usefulness and productivity of the group discussions, which suggests that this aspect of the program may need revision to ensure discussion activities are perceived as useful by participating students.

Year 7 Evaluations of their Leaders

The students were particularly positive in their evaluations of their peer support leaders. The vast majority of students indicated that their leaders were friendly (Item 15; 88.1% “mostly” to “totally” true) and that they could talk openly and easily to them (Item 14; 78.8% “mostly” to “totally” true). Furthermore, 82.7% reported that their leaders set a good example for students to follow (Item 16). Almost all students reported that their leaders gave information in a clear and understandable way (Item 13; 83.7% “mostly” to “totally” true) and that they were
efficient and organised (Item 17; 81.2% “mostly” to “totally” true). There was indication, however, that some leaders may have had some difficulty in managing and controlling the sessions, as 22.2% of students gave a negative response to Item 18 (“Leaders are good at managing and controlling the sessions”; 22.2% “mostly” to “totally” false).

These results suggest that Year 7 students generally had a very high opinion of their peer support leaders. The vast majority of students reported that their leaders were friendly, easy to talk to, and set a good example to follow. The results also provide good indication that the leaders performed their role proficiently, with a high number of Year 7 students reporting that the leaders were efficient, organised and capable at explaining the program content and tasks to the group. The highest proportion of negative responses were found on Item 18, however, with approximately one in five Year 7 students indicating that their leader had some difficulty in managing and controlling the group. These results may be identifying an important limitation in the skills of the peer support leaders in regard to effectively managing and controlling the sessions and consequently, imply the potential value of revising the program to include further training for the leaders in group management procedures.

**Leader Evaluation of Program Organisation**

A total of 32.9% of the leaders reported that the program was “definitely” not well organised and managed at their school (Item 1). Student evaluations of the leadership training were fairly equally divided, with 53.0% giving positive responses about the training and 47.0% giving negative responses (Item 2). Over half of the students indicated that the briefing they received was helpful for running the sessions (Item 3; 55.3% “totally” to “mostly” true). In particular, however, was that 46.4% of leaders responded “definitely false” to Item 4 regarding the usefulness of the debriefing sessions. In fact, various leaders wrote on their questionnaire that they had actually not received any debriefing at all throughout the program. Furthermore, 61.9% of students gave a negative response to Item 6, which indicates that most leaders did not receive useful feedback on how they were going throughout the program. Nevertheless, over 60% of students felt that the teachers had provided them
with good support throughout the program (Item 5; 64.3% “mostly” to “totally” true).

In summary, these results suggest that there were limitations at the school level in terms of program organisation, with a number of students reporting that they received little or no debriefing following the sessions. Most students also indicated that they received little useful feedback from the teachers on how they were going through the program. These results suggest, therefore, that it may be beneficial for schools to allocate additional time and resources to the coordination of the program, so that the teachers can effectively brief and debrief the leaders, provide them with useful feedback, and supply them with maximum levels of support throughout implementation.

**Leader Evaluation of Program**

In accordance with the results provided from Year 7 students, the peer leaders largely disagreed that the activities and topics of the program were interesting for the Year 7 students (77.6% “mostly” to “totally” disagree). Furthermore, responses regarding whether the topics of the program were relevant to the needs of the Year 7 students also tended to be more negative than positive, with 57.7% of students reporting that they “mostly” or “totally” disagree with their relevance. Consistent with the results reported by Year 7 students, the peer leaders also gave more positive than negative responses in their evaluation of the peer support groups. Almost 70% of leaders reported that the group members “totally” or “mostly” cooperated with each other and 60% indicated that the group members worked well as a team (Item 4). Student evaluations of whether the program provided an environment for the Year 7 students to establish new friendships were fairly equally divided, with half of the leaders giving positive responses (45.8% “mostly” to “totally” true) and the other half giving negative responses (54.2% “mostly” to “totally” false). Noticeably, this differs somewhat from the results reported by Year 7 students, where 70.2% indicated that they made new friendships during the program.

These results suggest that the program may be limited in terms of its activities and topics, with a large number of peer support leaders suggesting that activities were uninteresting for Year 7 students. Therefore, these results are consistent with the findings from Year 7 students and suggest that it may be beneficial to revise the
program activities to ensure that activities are of interest to Year 7 students. As with the responses of Year 7 students, the peer leaders’ evaluations of the peer support groups were much more positive, with a large proportion of students reporting that their group cooperated and worked well as a team. Furthermore, approximately half of the peer support leaders reported that the program provided an environment for the Year 7 students to establish new friendships.

**Leader Evaluation of Value to Self**

Respondents were particularly positive in their evaluations of the value of being a peer support leader. The vast majority indicated that being a peer support leader was valuable to their personal growth and development (68.3% “mostly” to “definitely” true). Furthermore, 82.3% of students reported that being a peer leader improved their leadership skills. Most students also felt that the program improved their communication skills (71.8% “mostly” to “totally” true). Almost 70% of leaders found their role to be challenging and stimulating. Finally, 40.0% of students reported that it was “definitely” worth the time involved to be a peer leader.

These results demonstrate that the vast majority of peer support leaders benefited personally from taking part in the program. Almost all students indicated that being a peer support leader helped to improve their leadership and communication skills and that the role was both challenging and stimulating.
<table>
<thead>
<tr>
<th>Item</th>
<th>Definitely or Totally True</th>
<th>Mostly True</th>
<th>Mostly False</th>
<th>Definitely or Totally False</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>N</td>
</tr>
<tr>
<td><strong>Program coordination</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Program was well organised and managed at this school</td>
<td>19 (22.4)</td>
<td>18 (21.2)</td>
<td>20 (23.5)</td>
<td>28 (32.9)</td>
<td>85</td>
</tr>
<tr>
<td>2. Leadership training adequately prepared me for my role as a peer leader</td>
<td>23 (27.1)</td>
<td>22 (25.9)</td>
<td>22 (25.9)</td>
<td>18 (21.2)</td>
<td>85</td>
</tr>
<tr>
<td>3. Briefings I received were helpful for running the sessions</td>
<td>26 (30.6)</td>
<td>21 (24.7)</td>
<td>15 (17.6)</td>
<td>23 (27.1)</td>
<td>85</td>
</tr>
<tr>
<td>4. Debriefings I received after the sessions were useful</td>
<td>15 (17.9)</td>
<td>13 (15.5)</td>
<td>17 (20.2)</td>
<td>39 (46.4)</td>
<td>84</td>
</tr>
<tr>
<td>5. Teachers provided good support throughout the program</td>
<td>31 (36.9)</td>
<td>23 (27.4)</td>
<td>21 (25.0)</td>
<td>9 (10.7)</td>
<td>84</td>
</tr>
<tr>
<td>6. Teachers gave me useful feedback on how I was going throughout the program</td>
<td>16 (19.0)</td>
<td>16 (19.0)</td>
<td>17 (20.2)</td>
<td>35 (41.7)</td>
<td>84</td>
</tr>
<tr>
<td><strong>Program and Group Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Activities and topics of the program were interesting to the Year 7’s</td>
<td>5 (5.9)</td>
<td>14 (16.5)</td>
<td>24 (28.2)</td>
<td>42 (49.4)</td>
<td>85</td>
</tr>
<tr>
<td>8. Topics of the program were relevant to the needs of Year 7 students</td>
<td>15 (17.6)</td>
<td>21 (24.7)</td>
<td>18 (21.2)</td>
<td>31 (36.5)</td>
<td>85</td>
</tr>
<tr>
<td>9. Students in my group cooperated with each other</td>
<td>31 (36.5)</td>
<td>26 (30.6)</td>
<td>11 (12.9)</td>
<td>17 (20.0)</td>
<td>85</td>
</tr>
<tr>
<td>10. Students in my group worked well as a team throughout the program</td>
<td>20 (23.5)</td>
<td>31 (36.5)</td>
<td>15 (17.6)</td>
<td>19 (22.4)</td>
<td>85</td>
</tr>
<tr>
<td>11. Program provided an environment for Year 7’s to establish new friendships</td>
<td>19 (22.9)</td>
<td>19 (22.9)</td>
<td>29 (34.9)</td>
<td>16 (19.3)</td>
<td>83</td>
</tr>
<tr>
<td><strong>Value to Self</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Being a peer leader was valuable for my personal growth and development</td>
<td>31 (36.5)</td>
<td>27 (31.8)</td>
<td>14 (16.5)</td>
<td>13 (15.3)</td>
<td>85</td>
</tr>
<tr>
<td>13. Being a peer leader was challenging and stimulating</td>
<td>22 (26.2)</td>
<td>34 (40.5)</td>
<td>16 (19.0)</td>
<td>12 (14.3)</td>
<td>84</td>
</tr>
<tr>
<td>14. Being a peer leader has improved my leadership skills</td>
<td>38 (44.7)</td>
<td>32 (37.6)</td>
<td>7 (8.2)</td>
<td>8 (9.4)</td>
<td>85</td>
</tr>
<tr>
<td>15. Being a peer leader has improved my communication skills</td>
<td>30 (35.3)</td>
<td>31 (36.5)</td>
<td>13 (15.3)</td>
<td>11 (12.9)</td>
<td>85</td>
</tr>
<tr>
<td>16. It was worth the time involved to be a peer leader</td>
<td>34 (40.0)</td>
<td>18 (21.2)</td>
<td>22 (25.9)</td>
<td>11 (12.9)</td>
<td>85</td>
</tr>
</tbody>
</table>

*Note.* Percentages are given in parentheses.
Summary of Quantitative Results

The purpose of Study 4 was to examine students’ perspectives of the strengths and weaknesses of peer support program. Clearly, the results from the quantitative questionnaire have provided insights into students’ views of the potential pros and cons of the intervention. Firstly, it appears that the utilisation of Year 10/11 students as peer support leaders is one particular strength of the program. The results demonstrated that most Year 7 students gave high evaluations of their peer support leaders, indicating they were easy to talk to, set a good example to follow and were generally well organised for the sessions. Furthermore, the results indicate that the peer support leaders benefited from conducting the program.

Another potential strength of the program appears to be the establishment of small peer support groups. The vast majority of Year 7 students indicated that they made new friends with other group members, felt comfortable and accepted within the group, and could talk openly with other group members. The intimacy of the small group enabled the group members to become familiar and comfortable with one another. However, the results also suggest that the program may not be without its limitations. The highest proportions of negative responses were found on items pertaining to the activities and exercises of the program. These results suggest that it may be necessary to revise the activities and exercises so as to make the program more stimulating and challenging for Year 7 students. The results also suggest that there were limitations at the school level in terms of program organisation. As this was the first time this program had been conducted in the participating schools, the teachers were inexperienced in conducting such a program which in turn made it more difficult for the leaders. Indeed, a number of teachers who were involved in the program remarked that the program will be much easier to implement the second time around.
Qualitative Results: Perceived Benefits for Year 7 Students

The discussion of results on the perceived benefits of the program for Year 7 students focuses primarily on six higher order themes that transpired from the qualitative data: student connectedness, problem solving ability, sense of self, optimistic thinking, school citizenship, and adjustment to secondary school (see Table 9.4). In general, these recurrent themes were woven throughout the written and verbal responses of both Year 7 students and their peer support leaders. This section begins by presenting a preliminary overview of the results from the open-ended questionnaire based upon content analysis, followed by detailed findings of each of the higher order themes that emerged from the open-ended questionnaire and focus discussion groups.

Preliminary Open-Ended Questionnaire Results

Student’s responses on the open-ended questionnaire were first coded as either positive, negative, or neutral (neither positive nor negative). The results from this preliminary analysis indicated that the peer support program had been a positive experience for the vast majority of Year 7 students. As shown in Table 9.3, 80% of Year 7 students made positive comments about the program. These students reported, for example, that the program was “fun”, “enjoyable”, “great” and “helpful”. Only 18% of Year 7 students felt that the program had not assisted them. The most common reasons students gave as to why they gained no benefit were that they were absent for the majority of the sessions or had previously participated in a similar program. Two percent were neutral, not being able to ascertain whether the program had been able to help them or not.

Year 10/11 student responses were in a similar vein to those of Year 7 students. Approximately 81% of peer support leaders stated that the program had been beneficial for Year 7 students. Only 19% of leaders reported that the program had not helped Year 7 students. The most common reason given as to why they received no benefit was that the students “didn’t pay attention”.

274
Table 9.3
Perceived Program Benefits for Year 7 Students: Frequency (and Percentage) of Open-Ended Questionnaire Responses Coded as Positive, Negative and Neutral for Year 7 students (N = 408) and peer support leaders (N = 75)

<table>
<thead>
<tr>
<th>Response</th>
<th>Year 7 n (%)</th>
<th>Leaders n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helped / fun / enjoyable / Learnt new things</td>
<td>327 (80.1)</td>
<td>61 (81.3)</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Didn’t help / didn’t enjoy it</td>
<td>74 (18.1)</td>
<td>14 (18.7)</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t know</td>
<td>7 (1.8)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

Preliminary Examination of Content Analysis Results

Table 9.3 provides a summary of the identified themes (from open-ended questionnaire responses and focus group discussions) regarding ways in which students perceived the program to be of benefit to the seventh grade students. Firstly, the results in this table demonstrate that there was a variety of identified benefits reported for Year 7 students. Furthermore, it is apparent that the results from the open-ended questionnaire items and focus discussion groups produced generally equivalent themes. It is noticeable, however, that comparatively more themes were produced from the focus group discussions than from the open-ended survey items. On average, between five and six themes were reported for each discussion group, while only one or two themes were given by each student in the open-ended survey. This was to be anticipated, as the focus discussions consisted of six to eight people, each of whom had their own perceptions of the benefits of the program. Furthermore, as pointed out by Stewart and Shamdasani (1990), the social setting of focus group discussions encourages respondents to react to and build upon the responses of other group members. Therefore, the synergistic effect of the group setting can produce more ideas or responses than what would be uncovered in individual survey items.
Table 9.4

Perceived Program Benefits for Year 7 Students: Response themes identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Open-ended questionnaire items</th>
<th>Focus group discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 7 (n = 408)</td>
<td>Leaders (n = 75)</td>
</tr>
<tr>
<td>1. Student Connectedness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made new friends / Became closer to old friends (T1.1)</td>
<td>81 (19.9)</td>
<td>24 (32.0)</td>
</tr>
<tr>
<td>Making friends with, gaining support and Help from older students (T1.2)</td>
<td>25 (6.1)</td>
<td>20 (26.7)</td>
</tr>
<tr>
<td>Understanding others and their feelings (T1.3)</td>
<td>51 (12.5)</td>
<td>17 (22.7)</td>
</tr>
<tr>
<td>Teamwork (T1.4)</td>
<td>24 (5.9)</td>
<td>15 (20.0)</td>
</tr>
<tr>
<td>Communication and social skills (T1.5)</td>
<td>29 (7.1)</td>
<td>12 (16.0)</td>
</tr>
<tr>
<td>2. Problem Solving Ability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving and decision making skills (T2.1)</td>
<td>38 (9.3)</td>
<td>11 (14.7)</td>
</tr>
<tr>
<td>Stress Management (T2.2)</td>
<td>4 (1.0)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>3. Sense of Self</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-understanding (T3.1)</td>
<td>25 (6.1)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>Self-confidence (T3.2)</td>
<td>28 (6.9)</td>
<td>3 (4.0)</td>
</tr>
<tr>
<td>4. Sense of Possibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimistic Thinking (T4.1)</td>
<td>27 (6.6)</td>
<td>2 (2.7)</td>
</tr>
<tr>
<td>5. School Citizenship</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bullying (T5.1)</td>
<td>13 (3.2)</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Help others (T5.2)</td>
<td>14 (3.4)</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>6. Adjustment to Secondary School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helped settle in and learn about high school (T6.1)</td>
<td>8 (2.0)</td>
<td>17 (22.7)</td>
</tr>
</tbody>
</table>

*Note.* Percentages are given in parentheses.

**Higher Order Theme 1: Student Connectedness**

Open-ended questionnaire items. The strongest finding that emerged from the open-ended questionnaire items was that the program helped to strengthen student connections (see Table 9.4). The most frequently reported benefit by Year 7 students, as well as the peer support leaders, was that the program encouraged students to
make new friends and become closer to old friends (Theme 1.1). Almost one in five Year 7 students, and one in three peer support leaders, indicated that the program was beneficial in increasing student relations. In addition, a considerable number of students stated that the program helped Year 7 students to form new friendships with older Year 10/11 students (Theme 1.2). The following quotations from by Year 7 students are illustrative of these two themes:

- It has helped me gain stronger friendships with my peers. Also, I am no longer worried or embarrassed to talk to students in other grades (Themes 1.1 & 1.2: Student Connectedness).
- It has been fun and helpful to work with people who we didn’t know. It has helped me make friends with students in my grade. (Theme 1.1: Student Connectedness)

Similar evaluations reflective of these two themes were made by Year 10/11 students:

- It gave them the opportunity to interact with each other, to get to know someone they didn’t know before and to interact with an older student. (Themes 1.1 & 1.2: Student Connectedness).
- I believe the program brought the group close together and they have also become friends with me (Themes 1.1 & 1.2: Student Connectedness).

Some students went on to say that, not only had the program given them the opportunity to interact with (and form friendships with) older students, but they also had been provided with a mentor, someone who they could look up to and turn to for help and advice (Theme 1.2). The following quotes by Year 7 and Year 10/11 students are illustrative of this view:

- I got to become friends with others and with my group leaders so that if I am ever in trouble I can go to them (Year 7 student; Theme 1.2: Student Connectedness).
- The Year 7 students knew that the peer support leaders were there as a guide to help them settle into Year 7. The Year 7 students have more confidence to know that there is a Year 10 student who is a peer support leader willing to help in any way (Peer leader; Theme 1.2: Student Connectedness).

It is important to point out, however, that considerably more Year 10/11 students identified Theme 1.2 than Year 7 students in the open-ended questionnaire items. Table 9.2 shows that one in five peer support leaders reported that the program
was beneficial in helping Year 7 students make friends with and gain support from older students, while less than 1 in 15 Year 7 students documented this theme. Perhaps the peer support leaders are demonstrating their own experiences of having to survive Year 7 with no such support. Alternatively, perhaps peer support leaders are more likely than Year 7 students to emphasise receiving their support as a key benefit of the program.

Another finding that emerged from the open-ended questionnaire items was that the program enhanced students’ understanding of others and their feelings (Theme 1.3). This was the second most frequently reported theme for Year 7 students and the third most frequently reported theme for peer support leaders. Both Year 7 and Year 10/11 students observed that the intervention encouraged participants to accept others for who they are and to be thoughtful of their feelings as is illustrated by the following comments:

I got an idea of what other people were feeling not just myself (Year 7 student; Theme 1.2: Student Connectedness).

It helped me to understand others and their feelings (Year 7 student; Theme 1.3: Student Connectedness).

Gave them the opportunity to think in the part of others...Increased their ability to empathise with others (Peer leader; Theme 1.3: Student Connectedness).

Both Year 7 and Year 10/11 students reported that the program improved teamwork among group members (Theme 1.4). Students stated that the intervention had increased teamwork by promoting cooperation among the group members, respect for different viewpoints and increased patience when working with others. This theme, however, was acknowledged by somewhat more Year 10/11 students than Year 7 students. As the senior students were such an integral part of the program, they were possibly in a good position to observe the changing attitudes and behaviour of the Year 7 students as the program progressed. The following quotes reported by Year 7 and Year 10/11 students are illustrative of this theme:

We learnt to work as a team and be cooperative (Year 7 student; Theme 1.4: Student Connectedness).

Helped them cooperate in groups, to communicate with each other and brainstorm ideas and thoughts (Peer leader; Theme 1.4: Student Connectedness).
They are now more friendly and patient when working in a group (Peer leader; Theme 1.4: Student Connectedness).

Another finding that surfaced from the open-ended questionnaire items was that the program enhanced students’ communication and social skills (Theme 1.5). This was the third most frequently reported theme for Year 7 students and the sixth most frequently reported theme for peer support leaders. Respondents explained that the intervention made Year 7 students feel more comfortable talking about their ideas, opinions and problems to others:

It taught me to communicate with others a lot more and to be more open (Year 7 student; Theme 1.5: Student Connectedness).

The Year 7 group began to feel comfortable and secure around their peers within the homeroom and the group...the students began to respect one another and communicate better with their new friends (Peer leader; Theme 1.5: Student Connectedness).

Allowed them to experience new concepts and open up when expressing ideas and opinions (Peer leader; Theme 1.2: Student Connectedness).

*Focus group discussions.* In accordance with the findings from the open-ended survey, the strongest finding that emerged from the focus discussion groups was that the program helped students to make new friends, as well as become closer to old friends (Theme 1.1). The following responses recorded during the focus group discussions are illustrative of this theme:

Got to know people from other classes we didn’t know (Year 7 focus group discussion; Theme 1.1: Student Connectedness).

Got to know people better (Year 7 focus group discussion; Theme 1.1: Student Connectedness).

Good for the Year 7's to meet new people (Peer leader focus group discussion; Theme 1.1: Student Connectedness).

Notably, this theme was identified in 16 out of the 17 focus group discussions conducted with Year 7 students and in five out of seven of those conducted with the peer support leaders. A high proportion of Year 7 and Year 10/11 students also pointed out the benefits in making new friends with older students (Theme 1.2):
The leaders made sure you were OK at home. When they found out something was going on, they talked you through it and made sure you were OK (Year 7 focus group discussion; Theme 1.2: Student Connectedness).

Year 7 had someone older to talk to (Peer leader focus group discussion; Theme 1.2: Student Connectedness).

The second most frequently mentioned benefit from Year 7 students was that the program improved teamwork among the group members (Theme 1.4). For example, it was pointed out that:

Within a team situation, more people are volunteering to do things and help each other than before (Year 7 focus group discussion; Theme 1.4: Student Connectedness).

Good to work with a group and learn to cooperate (Year 7 focus group discussion; Theme 1.4: Student Connectedness).

Previously it was noted for the open-ended survey items that there was a disparity between the responses for Year 7 and Year 10/11 students, with comparatively fewer Year 7 students identifying improvements to cooperative teamwork. However, within 10 of the 17 focus groups, Year 7 students reported that the intervention produced increases in teamwork. Similarly, this theme was identified in almost half of all focus groups conducted with peer support leaders as is illustrated by the following responses:

They gained group skills (Peer leader focus group discussion; Theme 1.4: Student Connectedness).

Encouraged the Year 7's to work as a team (Peer leader focus group discussion; Theme 1.4: Student Connectedness).

A strong finding that came out of the focus group discussions with Year 7 students was that the program enhanced their understanding of others and their feelings (Theme 1.3). This theme was reported in over half of the group discussions conducted with Year 7 students. The following comments made by Year 7 students are illustrative of this theme:

More understanding of the feelings of other people in the class (Year 7 focus group discussion; Theme 1.3: Student Connectedness).
Respect others for who they are and not what they look like (Year 7 focus group discussion; Theme 1.3: Student Connectedness).

While this theme emerged quite frequently in the open-ended survey responses of the Year 7 students, it was mentioned in only one out of seven of the senior student discussion groups. The leaders tended to focus their discussions more in the area of making new friends, rather than student enrichment in understanding others.

Approximately one in three discussion groups reported that the program enhanced students' communication and social skills (Theme 1.5). Year 7 students stated, for example, that they learnt "how to make friends", "how to interact with others” and "how to communicate with peers”. Similar supporting statements were made by Year 10/11 students. For example:

The Year 7s learnt how to communicate better with others (Peer leader focus group discussion; Theme 1.5: Student Connectedness).

**Summary.** Clearly, the strongest finding to emerge from the open-ended questionnaire responses and the focus group discussions was that the program helped students to make new friends and become closer to old friends. Students indicated that not only had they been given the opportunity to become closer to students in their own year group, but that they had been given the opportunity to interact and form friendships with older Year 10/11 students. Another clear theme to surface, particularly among Year 7 students, was that the program helped the Year 7 students to understand others and their feeling. For example, students explained that the intervention encouraged them to accept others for who they are and to be thoughtful of their feelings. Several Year 7 students and peer support leaders also indicated that the program had enhanced cooperative teamwork and communication and social skills.

**Higher Order Theme 2: Problem-Solving Ability**

**Open-ended questionnaire items.** A frequently reported benefit by both Year 7 and Year 10/11 students was that the program was beneficial in enhancing students' problem solving and decision making skills (Theme 2.1). This theme was the second most frequently reported benefit by Year 7 students and identified by
almost one in six of the peer support leaders. Respondents pointed out that the program taught them how to cope effectively with difficult situations. The following quotes by Year 7 and Year 10/11 students are demonstrative of this theme:

It taught me how to deal with problems (Year 7 student; Theme 2.1: Problem Solving Ability).

It helped them make better decisions and more aware of how to deal with difficult situations (Peer leader; Theme 2.1: Problem Solving Ability).

It has prepared them for some of the problems they might have in high school (homework, friends and family) (Peer leader; Theme 2.1: Problem Solving Ability).

Some students went on to explain that the program increased their awareness of the importance of seeking assistance where needed, as illustrated in the following quotes:

It has made me realise when I have a problem I can talk to someone who will help (Year 7 student; Theme 2.1: Problem Solving Ability).

It helped me understand to look towards others for help instead of just trying to ignore it (Year 7 student; Theme 2.1: Problem Solving Ability).

A small number of students also specifically noted that the program was helpful in teaching them how to cope with stress (Theme 2.2). The following comments from Year 7 and Year 10/11 students are examples:

I have not been so stressed out (Year 7 student; Theme 2.2: Problem Solving Ability).

They are more able to cope with stressful situations (Peer leader; Theme 2.2: Problem Solving Ability).

It taught them how to cope with the stresses of Year 7 life (Peer leader; Theme 2.2: Problem Solving Ability).

**Focus group discussions.** Consistent with the findings from the open-ended survey, a strong finding that came out of the focus group discussions was that the program enhanced problem solving and decision making skills (Theme 2.1). This theme was identified in 10 out of 17 of the discussion groups conducted with Year 7 students and in four out of seven of those conducted with the peer support leaders.
The following responses recorded during the focus group discussions are illustrative of this theme:

Learn that there are more options/choices than one in problems (Year 7 focus group discussion; Theme 2.1: Problem Solving Ability).

They learnt how to make more informed decisions (Peer leader focus group discussion; Theme 2.2: Problem Solving Ability).

In accordance with responses in the open-ended survey, students explained that they were encouraged to turn to others for support and guidance in the face of difficult situations. For example:

We learnt that we could go to our peers and talk about things (Year 7 focus group discussion; Theme 2.1: Problem Solving Ability).

Important to talk to others if we have problems. (Year 7 focus group discussion; Theme 2.1: Problem Solving Ability).

For the open-ended questions, a small number of students reported that the program was helpful in teaching them how to cope with stress (Theme 2.2). However, this theme was only mentioned in one discussion group, where Year 7 students pointed out that they learnt how to prepare and study for exams so as to avoid stress.

**Summary.** A clear finding which surfaced from the open-ended questionnaire and the focus discussion groups was that the program enhanced Year 7 students’ problem solving and decision-making skills. Year 7 students and their peer support leaders indicated that the program taught them to cope and deal with difficult situations and, in particular, to seek assistance if required. Some students also mentioned that the program was beneficial in enhancing their stress management skills.

**Higher Order Theme 3: Sense of Self**

**Open-ended questionnaire items.** An important theme reported, particularly by Year 7 students, was that the program enhanced self-understanding (Theme 3.1). Respondents indicated that the program helped students to develop a sense of their own worth and dignity, and to value themselves for who they are. Comparatively more Year 7 students identified this theme than peer support leaders. This disparity
was probably due to the obvious difficulty for leaders in observing, or being aware of, any changes in Year 7 student’s self-understanding. The following quotes by Year 7 and Year 10/11 students are illustrative of this theme:

It made me understand myself more than I did before (Year 7 student; Theme 3.1: Sense of Self).

Peer support has helped me understand myself even more (Year 7 student; Theme 3.1: Sense of Self).

It has allowed the Year 7 students to recognise their strengths and weaknesses (Peer leader; Theme 3.1: Sense of Self).

A significant portion of students also reported that the program enhanced their self-confidence (Theme 3.2). Respondents indicated that the program gave them the confidence to be themselves and not to be influenced negatively by others or submit to peer pressure. Comparatively more Year 7 students identified this theme than Year 10/11 students. Again, this was probably due to the difficulty for leaders to observe, or be aware of, any changes in this domain. The following quotes identified by Year 7 and Year 10/11 students are characteristic of this theme:

It has helped me to see the individual in myself and become a leader not a follower (Year 7 student; Theme 3.2: Sense of Self).

It has helped me by building my confidence (Year 7 student; Theme 3.2: Sense of Self).

Built up their confidence (Peer leader; Theme 3.2: Sense of Self).

**Focus group discussions.** In accordance with the findings from the open-ended survey, a fairly prevalent theme to emerge from the group discussions with Year 7 students was that the program enhanced self-understanding. This theme was identified in roughly one in three of the Year 7 discussion groups. The following comments made by Year 7 students are illustrative of this view:

Helped me understand myself better (Year 7 focus group discussion; Theme 3.1: Sense of Self).

Learnt things I was good at and wasn’t good at (Year 7 focus group discussion; Theme 3.1: Sense of Self).
Also consistent with previous findings was that considerably fewer peer support leaders brought up this theme in the discussion groups than Year 7 students.

A fairly dominant theme which came out of almost half of all focus group discussions was that the program enhanced self-confidence. This theme was reported in similar frequency by Year 7 students and peer support leaders. The following quotes from Year 7 and Year 10/11 students are characteristic of comments made during the discussion groups:

More confidence to try new things (Year 7 focus group discussion; Theme 3.2: Sense of Self).

They gained confidence (Peer leader focus group discussion; Theme 3.2: Sense of Self).

**Summary.** Two clear themes that surfaced from the open-ended questionnaire and the focus group discussions were that the program increased self-understanding and self-confidence. These themes became apparent particularly in responses of Year 7 students who indicated that the program helped them to value themselves for who they are and to have the confidence to be themselves and not to be influenced negatively by others. These themes were also identified in the responses of the peer support leaders but generally to a lesser extent than the responses of Year 7 students.

**Higher Order Theme 4: Sense of Possibility**

**Open-ended questionnaire items.** A rather prevalent theme that emerged from the comments of Year 7 students was that the program was beneficial enhancing optimistic thinking (Theme 4.1). One in 15 Year 7 students reported that the program had benefited them in this way. However, a relatively lower proportion of peer support leaders identified this theme. This was probably due to the difficulty for leaders in observing, or being aware of, any changes in Year 7 students’ thinking. Year 7 students explained that the program taught them to think positively rather than negatively:

It was helpful because I learned how being optimistic is better than pessimistic (Year 7 student, Theme 4.1: Sense of Possibility).

It has helped me understand that being optimistic is a better thing to be as you want to get through life a more successful and happier person in the future (Year 7 student; Theme 4.1: Sense of Possibility).
It has taught me to look on the bright side of bad situations (Year 7 student; Theme 4.1: Sense of Possibility).

**Focus group discussions.** Consistent with the responses from the open-ended survey, increases in optimistic thinking were mentioned by Year 7 students as an important benefit of the program. This theme was identified in over half of the discussion groups conducted with Year 7 students. Among Year 10/11 students, this theme was also fairly prevalent, emerging in more than one in three of the discussion groups. The following quotes from Year 7 and Year 10/11 students are illustrative of this theme:

Learnt to be optimistic. It is better to think on the positive or bright side (Year 7 focus group discussion; Theme 4.1: Sense of Possibility).

To be positive at all times (Peer leader focus group discussion; Theme 4.1: Sense of Possibility).

**Summary.** An important theme that became apparent, particularly in the focus group discussions, was that the program enhanced optimistic thinking. Students explained that the program taught them to think positively rather than negatively and the important benefits of this way of thinking on their lives. This theme was also identified in the open-ended questionnaire, especially in the responses of Year 7 students.

**Higher Order Theme 5: School Citizenship**

**Open-ended questionnaire items.** Thirteen Year 7 students specifically mentioned in the open-ended survey that the program had improved students' perceptions of bullying and what to do if bullying occurs (Theme 5.1). The following comments made by Year 7 students are illustrative of changes in this domain:

It has taught me to have the right attitude and to be nice to other people because you wouldn’t like it if someone continuously bullied you (Year 7 student; Theme 5.1: School Citizenship).

It has taught me what to do when I was bullied and who to turn to (Year 7 student; Theme 5.1: School Citizenship).

It has helped me become friends with a person in the group who was a bully to me (Year 7 student; Theme 5.1: School Citizenship).
However, this theme was only mentioned by one peer support leader who stated that:

It helped them to understand the importance of schooling and the bullying system (Peer Support Leader; Theme 5.1: School Citizenship).

Various Year 7 responses to the open-ended items also indicated that the program encouraged students to help and care for one another (Theme 5.2). This theme was identified by roughly 1 in 25 students. For example:

I’ve learnt to be more caring towards others (Year 7 student; Theme 5.2: School Citizenship).

I’m able to give advice to others in need (Year 7 student; Theme 5.2: School Citizenship).

This theme was only reported by one peer support leader who stated that:

The Peer Support Program has helped Year 7 students to be more involved with each other and to help each other out with their problems (Peer Support Leader; Theme 5.2: School Citizenship).

**Focus group discussions.** In concordance with the responses from the open-ended survey, a fairly prevalent theme to emerge from the group discussions with Year 7 students was that the program changed their perceptions of bullying (Theme 5.1). This theme was identified in roughly one in three of the Year 7 discussion groups. The following comments made by Year 7 students are illustrative of this theme:

Learnt not to bully and what to do if you are bullied (Year 7 focus group discussion; Theme 5.1: School Citizenship).

Taught us how to handle bullying without violence (Year 7 focus group discussion; Theme 5.1: School Citizenship).

Only one group of Year 7 student reported that the program encouraged them “to be friendly and help others” (Theme 5.2). Neither theme relating to school citizenship (Themes 5.1 & 5.2) was mentioned by peer leaders in the focus group discussions, which is consistent with findings from the open-ended questionnaire.

**Summary.** A fairly important theme identified in the responses of Year 7 students was that the program improved students’ perceptions of bullying. This
theme surfaced in Year 7 students’ open-ended questionnaire responses and focus group discussions. Students explained that the intervention encouraged them not to bully others and suggested who to turn to for assistance if bullying occurs. Interestingly, a student also identified that the program had resulted in establishing a rapport with a person who had previously bullied them. A number of Year 7 students also reported that the program taught them to be more caring and helpful towards others. This theme became apparent particularly in Year 7 students’ open-ended responses. However, neither of these themes emerged in the responses of the peer support leaders in either the open-ended questionnaire or the focus group discussions.

**Higher Order Theme 6: Adjustment to Secondary School**

*Open-ended questionnaire items.* An important theme identified, particularly by Year 10/11 students, was that the program helped students settle in and learn about secondary school (Theme 6.1). This theme was reported by more than one in five peer support leaders. However, considerably fewer Year 7 students mentioned this theme. Here, the peer support leaders could well be demonstrating their own experiences in having to adapt to the secondary school environment with no such program. The following comments made by the peer support leaders are demonstrative of this theme:

The Year 7 students were firstly very scared when they made their step into high school. The pressure of assignments and exams was very stressful and peer support helped them deal with difficulties (Peer leader; Theme 6.1: Adjustment to Secondary School).

The Peer Program has been helpful to Year 7 students as they have been able to establish a good understanding and a comfortable environment when being at high school for the first time (Peer leader; Theme 6.1: Adjustment to Secondary School).

Similar, though not so frequent, supporting quotes were made by Year 7 students:

They have helped me settle in and become happy to ensure I will have a safe and fun learning time at school (Year 7 student; Theme 6.1: Adjustment to Secondary School).

It helped me through the start of high school (Year 7 student; Theme 6.1).
**Focus group discussions.** A fairly dominant theme that came out of approximately one in four of all focus group discussions was that the program helped students settle into school and learn about their new environment (Theme 6.1). Previously it was noted for the open-ended survey items that there was a disparity between the responses for Year 7 and Year 10/11 students, with comparatively fewer Year 7 students identifying assistance in adjustment to school. However, in the focus group discussions this theme was reported in similar frequencies for Year 7 and Year 10/11 students. The following comments are illustrative of this theme:

They showed us around the school—where everything was (Year 7 focus group discussion; Theme 6.1: Adjustment to Secondary School).

Scary being the smallest at the school. The program made it less scary and threatening (Peer leader focus group discussion; Theme 6.1: Adjustment to Secondary School).

**Summary.** These results suggest that the program helped Year 7 students adjust to secondary school. This theme emerged particularly in the response of the peer support leaders who explained that the program provided the Year 7 students with a good understanding of their new school and provided them with a secure environment. This theme was also identified by the Year 7 students, particularly in the focus group discussions.
Qualitative Results: Perceived Benefits for the Peer Support Leaders

The discussion of results in this section focuses primarily on five higher order themes that transpired from the qualitative data regarding perceived benefits of the program for the peer support leaders: leadership ability, student connectedness, sense of self, teacher relations, and responsibility (see Table 9.5). In general, these recurrent themes were identified throughout the written and verbal responses of Year 10/11 students. The results in this section begin with a preliminary overview of the findings from the open-ended questionnaire and content analysis, followed by detailed examination of each of the higher order themes with emerged from the open-ended questionnaire and focus group discussions.

Preliminary Open-Ended Questionnaire Results

Student’s responses on the open-ended questionnaire were firstly coded as either positive, negative, or neutral. The results from this preliminary analysis indicated that 88% (n = 66) of peer support leaders reported that the intervention had been of benefit to themselves. These students reported, for example, that the program helped them to attain “new skills” and was valuable to their “personal growth and development”. Only 12% of Year 10/11 students felt that they had not gained anything from the experience of being a peer support leader. The most common reason students gave as to why they gained no benefit was that they “already had the skills needed” or that the program was “not organised well”.

Preliminary Examination of Content Analysis Results

A summary of the identified themes (from open-ended questionnaire responses and focus group discussions) regarding the perceived benefits for the peer support leaders is presented in Table 9.4. The results of this table demonstrate that there was a variety of perceived benefits from being a peer support leader, each of which will be discussed in the following sections. Furthermore, it is apparent that the results from the open-ended questionnaire items and focus discussion groups generally produced equivalent themes.
Table 9.5

Response Themes Identified Regarding the Perceived Benefits of the Program for Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Open-ended questionnaire items (n = 75)</th>
<th>Focus discussion groups (n = 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Leadership Ability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership skills (T1.1)</td>
<td>30 (40.0)</td>
<td>6 (85.7)</td>
</tr>
<tr>
<td>Communication and listening skills (T1.2)</td>
<td>29 (38.7)</td>
<td>4 (57.1)</td>
</tr>
<tr>
<td>Working with people &amp; patience (T1.3)</td>
<td>14 (18.7)</td>
<td>3 (42.9)</td>
</tr>
<tr>
<td>Control of students (T1.4)</td>
<td>10 (13.3)</td>
<td>5 (71.4)</td>
</tr>
<tr>
<td>Organisational skills (T1.5)</td>
<td>4 (5.3)</td>
<td>4 (57.1)</td>
</tr>
<tr>
<td><strong>2. Student Connectedness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made new friends (T2.1)</td>
<td>4 (5.3)</td>
<td>2 (28.6)</td>
</tr>
<tr>
<td>Understanding others &amp; how to help them (T2.2)</td>
<td>11 (14.7)</td>
<td>4 (57.1)</td>
</tr>
<tr>
<td><strong>3. Sense of Self</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-understanding (T3.1)</td>
<td>6 (8.0)</td>
<td>0 (00.0)</td>
</tr>
<tr>
<td>Self-confidence (T3.2)</td>
<td>4 (5.3)</td>
<td>3 (42.9)</td>
</tr>
<tr>
<td><strong>4. Teacher Relations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding work &amp; role of teachers (T4.1)</td>
<td>5 (5.3)</td>
<td>5 (71.4)</td>
</tr>
<tr>
<td><strong>5. Responsibility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsibility (T5.1)</td>
<td>2 (2.7)</td>
<td>6 (85.7)</td>
</tr>
</tbody>
</table>

*Note.* Percentages are given in parentheses.

**Higher Order Theme 1: Leadership Ability**

*Open-ended questionnaire items.* The most frequently reported comment made by the peer support leaders was that the program had helped them to develop “stronger leadership skills” (Theme 1.1). Specific reference to enhanced leadership skills was reported by more than one in every three leaders.

The peer support leaders identified a variety of specific skills they had developed in order to perform their roles effectively. A particularly strong finding that emerged from the open-ended survey was that the program enhanced
communication and listening skills (Theme 1.2). More than one in three peer support leaders indicated that the program had benefited them in this way. The following quotations are illustrative of this theme:

I believe that it helped my communication skills with not only people in my own age group but also younger and older. I have the ability to speak up and to express my feelings (Peer leader; Theme 1.2: Leadership Ability).

I learnt how to listen more and how to explain things so that others can understand what I’m telling them about (Peer leader; Theme 1.2: Leadership Ability).

Another clear finding that surfaced from the open-ended questionnaire items was that the program helped Year 10/11 students to work with a group of students (Theme 1.3), with close to one in five senior students identifying this theme. Respondents explained that, as the program progressed, they learnt ways to encourage students to work well and cooperate with one another. The leaders also indicated that they developed more patience, particularly when confronted by students in the group who would not listen or cooperate. The following quotes are demonstrative of the skills attained in this domain:

How to get a group of very different student individuals to try to work together (Peer leader; Theme 1.3: Leadership Ability).

More patience in group work with people of different ages (Peer leader; Theme 1.3: Leadership Ability).

Furthermore, a considerable number of peer support leaders stated that the program enhanced their ability to take charge or control of a group (Theme 1.4). About one in seven students identified this theme in the open-ended questionnaire items, stating for example:

I was able by the end, to have better control of the group. I didn’t seem to have any difficulties letting them know who was in charge (Peer leader; Theme 1.4: Leadership Ability).

Some leaders, however, indicated that taking charge of the group was often not easy and on occasions became frustrated with students who would not cooperate. For example:
I learnt a bit about how to control a group. I also learnt that no matter what you do, some will not co-operate or listen. I think I could have been a little more tolerant but it got frustrating at times. I learnt control of a group is important (Peer leader; Theme 1.4: Leadership Ability).

A small number of students also stated that the program enhanced their organisational skills (Theme 1.5). This theme was identified by four of the peer support leaders. For example:

I found that I became more organised (Peer leader; Theme 1.5: Leadership Ability).

I had to be organised to ensure that everything was to run smoothly (Peer leader; Theme 1.5: Leadership Ability).

**Focus group discussions.** In accordance with the findings from the open-ended questions, a strong overall finding that came out of the focus group discussions was that the program enhanced the senior students’ leadership abilities. A specific response reported in six out of seven of the discussion groups was that the intervention increased their “leadership skills” (Theme 1.1). Many students also mentioned that they were given “insight into disciplinary problems” and learnt how to overcome them (Theme 1.4). This theme was identified in five out of seven of the discussion groups. The following responses are illustrative of this theme:

Learnt how to get others to listen to you without yelling (Peer leader focus group discussion; Theme 1.4: Leadership Ability).

Learnt how to deal with difficult behaviour in the group (Peer leader focus group discussion; Theme 1.4: Leadership Ability).

Consistent with findings of the open-ended questions, the enhancement of “communication skills” (Theme 1.2) emerged as an important theme in the focus group discussions. This theme was mentioned in more than half of all discussion groups conducted with peer support leaders.

A theme that emerged relatively more frequently in the focus group discussions than in the open-ended survey was that the program increased the leaders’ organisational skills (Theme 1.5). This theme was mentioned in over fifty percent of all discussion groups conducted with the peer support leaders. For example, students stated that:
I had to be organised. Had to know what to do for the lesson and time management (Peer leader focus group discussion; Theme 4: Leadership Ability).

Finally, peer support leaders reported that the program helped them to work with others and to be “more patient” (Theme 1.3). This theme was identified in three out of the seven discussion groups. What emerged from these group discussions was that the program helped them not only to work with Year 7 students, but also with their partner leaders. The following points made during the discussion groups are examples:

    Cooperation as a team player – help each other (Peer leader focus group discussion; Theme 1.3: Leadership Ability).

    Year 10 partner team (Peer leader focus group discussion; Theme 1.3: Leadership Ability).

**Summary.** The strongest finding to emerge from the open-ended questionnaire and the focus group discussions was that the program enhanced the Year 10/11 students’ leadership abilities. Specific reference to enhanced “leadership skills” was reported in the open-ended questionnaire by one in three leaders and in six out of seven of the discussion groups. A large proportion of students further explained that the program helped to improve their communication and listening skills. In particular, leaders reported that they learnt how to better explain the content and activities of the program to the group, as well as how to listen effectively to each of the group members. Another clear finding that emerged from open-ended questionnaire and the focus group discussions was that the program helped the peer support leaders to manage a group of students, especially in relation to learning ways to encourage students to work well and cooperate with one another. The leaders also reported that, as the program progressed, they were more successfully able to overcome disciplinary problems in the group. Finally, various leaders pointed out, particularly in the focus group discussions, that the program increased their organisational skills.
Higher Order Theme 2: Student Connectedness

Open-ended questionnaire items. The second most prevalent finding from peer leaders’ responses to the open-ended questions was that the program enhanced student connections. To begin with, one in ten peer support leaders reported that they made new friends with other students (Theme 2.1). For example:

It has enabled me to develop friendships with other students (Peer leader; Theme 2.1: Student Connectedness).

I now know Year 7 students I can talk to (Peer leader; Theme 2.1: Student Connectedness).

In addition, several peer leaders pointed out that the program helped them to better understand others and how to help them (Theme 2.2). This theme was identified by approximately one in seven leaders. The following quotes are illustrative of the benefits attained in this domain:

How to help people when they need help. It also helped me to understand others more and get along with my peers (Peer leader; Theme 2.2: Student Connectedness).

It has allowed me to gain an attribute to my character in empathy. I did this through the arguments, which we had, letting me be “in their shoes” and understand what they are feeling (Peer leader; Theme 2.2: Student Connectedness).

Focus group discussion. Consistent with the findings from the open-ended questionnaire items, an important theme that became apparent in the focus group discussions was that the program helped to increase student connections. In two out of seven discussion groups, students mentioned that the program helped them to “make new friends” and to form new connections that “perhaps would not have normally been formed” (Theme 2.1).

Furthermore, in over half of all the discussion groups, peer support leaders indicated that being a leader helped them to better understand others and how to help them (Theme 2.2). For example, students mentioned that they:

Gained an understanding of others and their families (Peer leader focus group discussion; Theme 2.2: Student Connectedness).
Students in one focus discussion group particularly noted that it was “good to see the reverse side of being a senior” as this helped to remind them of the difficulties experienced by Year 7 students.

**Summary.** An important finding to emerge from the open-ended questionnaire and focus group discussions was that the program enhanced student connections. First, a number of peer support leaders reported that the program helped them to make new friends with the Year 7 students. Some leaders further explained that, if the program had not been conducted, these friendships would probably not have been formed. Second, numerous peer support leaders reported that the program was beneficial in helping them to better understand others and how to help them. This theme was identified in the open-ended questionnaire by one in seven leaders and in four out of seven of the discussion groups. The leaders noted that they learnt how to get along better with their peers, how to empathise with others, and how to help Year 7 students if they required assistance.

**Higher Order Theme 3: Sense of Self**

**Open-ended questionnaire items.** An important theme reported by Year 10/11 students was that the program enhanced self-understanding (Theme 3.1). Approximately 1 in 12 students indicated that being a peer support leader helped them to gain a realistic perception about their own personal capabilities and to value themselves as individuals. For example:

I’ve learnt a lot about myself and the things I can do (Peer leader; Theme 3.1: Sense of Self).

I’ve developed a greater appreciation of myself (Peer leader; Theme 3.1: Sense of Self).

A similar number of Year 10/11 students reported that the program enhanced their self-confidence (Theme 3.2). In particular, respondents indicated that the program increased their confidence in their ability to speak in front of a group, as illustrated in the following examples:

I’ve become more comfortable about being myself in front of people I didn’t know (Peer leader; Theme 3.2: Sense of Self).
It’s helped a lot in calming my nerves in things such as public speaking and other performing. It’s given me confidence (Peer leader; Theme 3.2: Sense of Self).

**Focus group discussions.** Consistent with the findings from the open-ended questionnaire items, an important theme that came out of the focus group discussions was that being a peer support leader increased their self-confidence (Theme 3.2). This theme was identified in almost half of all discussion groups conducted with the peer support leaders. In accordance with the findings from the open-ended questionnaire items, the leaders particularly noted that the program increased their “confidence talking to groups”. However, Theme 3.1, regarding increases in self-understanding, was not mentioned by the peer support leaders in the focus group discussions.

**Summary.** A finding that became apparent in the open-ended questionnaire responses of the peer support leaders was that the program improved their self-understanding. Approximately one in twelve leaders identified this theme, noting that the program helped them to gain a realistic perception about their own personal capabilities and to value themselves as individuals. However, this theme did not emerge for the peer support leaders in the focus group discussions. However, an important finding that became apparent in both the open-ended questionnaire and focus group discussions was that the program enhanced their self-confidence, with leaders particularly noting increased confidence when speaking in front of a group.

**Higher Order Theme 4: Teacher Relations**

**Open-ended questionnaire items.** Some students pointed out that being a peer support leader helped them to understand the work and role of teachers (Theme 4.1). They stated that it made them realise how difficult it is to manage a group of students, particularly if they are not cooperative. The following quotes are demonstrative of this theme:

It gave me a new perspective on what it’s like for teachers to stand up in front of everyone (Peer leader; Theme 4.1: Teacher Relations).

Opened my eyes to see how annoying it is to have a student mucking around when you are trying to teach (Peer leader; Theme 4.1: Teacher Relations).
Focus group discussion. A strong theme that emerged from the focus group discussions was that the program helped the leaders to understand the work and role of teachers (Theme 4.1). While this theme was reported by only five students in the open-ended survey, this theme emerged in five out of seven of the focus group discussions. Students stated, for example, that they:

Learnt how hard it is for teachers (Peer leader focus group discussion; Theme 4.1: Teacher Relations).

Gained respect for teachers because you understand what they go through (Peer leader focus group discussion; Theme 4.1: Teacher Relations).

Summary. An important finding, particularly in the focus group discussions, was that the leaders developed an understanding of the work and role of teachers. Students explained that the program increased their awareness of the difficulties associated with managing a group of students and as a result, they developed a strong appreciation and respect for the teachers. Indeed, a number of teachers who were involved in the program independently remarked to the primary researchers involved in this study that they had noticed significant improvements in teacher-student relations and that the peer support leaders had become much better behaved in class. Hence, it seems that the effects of the program may also extend to teacher-student relationships.

Higher Order Theme 5: Responsibility

Open-ended questionnaire items. Two students mentioned that the program gave them a sense of responsibility (Theme 5.1). These students stated that they benefited from:

Showing responsibility to a younger age group (Peer leader; Theme 5.1: Responsibility).

To show responsibility (Peer leader; Theme 5.1: Responsibility).

Focus group discussion. One of the most frequently mentioned benefits of the focus group discussions was a gratifying sense of responsibility (Theme 5.1). In almost all of the group discussions, the peer support leaders spoke of their satisfaction in serving as a "role model" and their responsibility to remain committed
to the program. The following comments are illustrative of the benefits the leaders attained from the program:

Being a role model and an understanding of its impact (Peer leader focus group discussion; Theme 5.1: Responsibility).

Responsibility and Commitment – Hanging in there (Peer leader focus group discussion; Theme 5.1: Responsibility).

**Summary.** A prevalent theme that became apparent in the focus group discussions was that the peer support program gave the leaders a satisfying sense of responsibility. The leaders reported on their position with a sense of pride, noting that they were seen as a role model for the Year 7 students and accordingly, were required to act appropriately and remain committed to the program. This theme was also identified in the leaders’ responses to the open-ended questionnaire, though to a much lesser extent than in the focus group discussions.
Perceived Limitations of the Program

For the open-ended questionnaire, approximately 15% \((n = 67)\) of Year 7 students and 48% \((n = 36)\) of leaders identified limitations of the peer support program. Table 9.6 provides a summary of the themes that emerged from the open-ended surveys and focus discussion groups. This table shows seven themes that were derived from student responses, which will be discussed in detail in the following sections.

Table 9.6

*Response Themes Regarding Perceived Limitations of the Peer Support Program Identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Open-ended questionnaire items</th>
<th>Focus discussion groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 7 ((n = 67))</td>
<td>Leaders ((n = 36))</td>
</tr>
<tr>
<td>Program Activities (T1)</td>
<td>56 (83.6)</td>
<td>22 (61.1)</td>
</tr>
<tr>
<td>Program Organisation (T2)</td>
<td>1 (1.5)</td>
<td>13 (36.1)</td>
</tr>
<tr>
<td>Peer Support Leaders (T3)</td>
<td>7 (10.4)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Time of Commencement (T4)</td>
<td>0 (0.0)</td>
<td>5 (13.9)</td>
</tr>
<tr>
<td>Disciplinary Problems (T5)</td>
<td>1 (1.5)</td>
<td>6 (16.7)</td>
</tr>
<tr>
<td>Length of Program (T6)</td>
<td>2 (3.0)</td>
<td>1 (2.8)</td>
</tr>
<tr>
<td>Group Selection (T7)</td>
<td>1 (1.5)</td>
<td>2 (5.6)</td>
</tr>
</tbody>
</table>

*Note.* Percentages are given in parentheses.

**Theme 1: Program Activities**

*Open-ended questionnaire items.* By far the strongest problem to emerge from the open-ended questionnaire items was a lack of interest in some of the program’s activities (Theme 1). Of those who identified problems, this theme was reported by four out of five Year 7 students and by three out of five peer support leaders. Students felt that some of the activities were “boring”, as illustrated in the following quotes made by Year 7 students:
The peer support program was worthwhile but the activities (bar the bridge building) were a little boring (Year 7 student; Theme 1: Program Activities).

Some of the activities were a bit boring (Year 7 student; Theme 1: Program Activities).

Some respondents went on to explain that lack of interest in the program occurred because the activities were too "simple" and "childish":

I thought that some of the activities in the peer support classes were a bit babyish (Year 7 student; Theme 1: Program Activities).

The activities that were given were good, although some of the ones were not very appropriate to the Year 7 age group, which led them to be bored and uninterested (Peer leader; Theme 1: Program Activities).

Others indicated that the activities involved far too much writing and not enough social interaction:

The peer support program activities were good for them, but with all the things going on they didn’t want to sit and write things out, but talk (Peer leader; Theme 1: Program Activities).

The sheets were OK but you have to have more social interaction (Year 7 student; Theme 1: Program Activities).

Overall, respondents recommended that the activities be more practical and fun, and that more outdoor games should be introduced, as illustrated in the following quotes reported by Year 7 students:

Maybe we could have done more practical exercises to make it a bit more interesting and fun (Year 7 student; Theme 1: Program Activities).

I think if we had more fun games people might pay attention. (Year 7 student; Theme 1: Program Activities).

Similar recommendations were made by the peer support leaders:

More active hands on activities to make people think would be good (Peer leader; Theme 1: Program Activities).

I think they should add some more games next time (Peer leader; Theme 1: Program Activities).
**Focus group discussions.** In accordance with the findings from the open-ended questions, the most prevalent issue identified from the focus group discussions concerned boredom with some of the program activities (Theme 1). This theme was identified in over half of all discussion groups conducted with Year 7 students, who explained that some of the “worksheets” were not fun and a couple of the games were “childish”. This theme emerged even more strongly in the discussion groups conducted with Year 10/11 students (i.e., in six out of seven groups), who indicated that:

Younger kids thought some of the activities were boring—writing etc. and too detailed (Peer leader focus group discussion; Theme 1: Program Activities).

Some of the activities were babyish and boring for the Year 7’s (Peer leader focus group discussion; Theme 1: Program Activities).

In line with the recommendations proposed in the open-ended questionnaire items, Year 7 and Year 10/11 students recommended in the focus discussion groups that the program should consist of more practical activities and games. Students pointed out that:

Activities needed to be more physical and consist of more problem solving (Peer leader focus group discussion; Theme 1: Program Activities).

Year 7’s preferred physical and constructive activities—e.g., bridge building (Peer leader focus group discussion; Theme 1: Program Activities).

**Summary.** These results clearly suggest that it may be beneficial for the activities of the program to be revised so as to make the program more interesting and fun for the Year 7 students. Certainly, it is important that the activities of the program are at the appropriate age-level of the students so as to ensure that they are eager to participate and will remain enthusiastic for the entirety of the program. Consideration should be given to students’ recommendation that the activities should involve more social interaction, fewer written tasks, and more physical activities.

**Theme 2: Program Organisation**

**Open-ended questionnaire items.** The second most pertinent issue reported by the peer support leaders related to problems in program organisation (Theme 2). This theme was reported by approximately one in three peer support leaders. Several
students complained that the teachers did not prepare them well enough before each session. They also pointed out that they received little support from the teachers and were provided with no debriefing. The following quotes by Year 10/11 students are illustrative of this theme:

We didn’t have any debriefing afterwards and we only got the work 5 minutes before the start and half the time we didn’t have a clue what we were supposed to do (Peer leader; Theme 2: Program Organisation).

Debriefing and briefing was needed more (Peer leader; Theme 2: Program Organisation).

In the future, it would be good to further inform the leaders about the task (Peer leader; Theme 2: Program Organisation).

Some peer leaders also indicated that they would have preferred it if the teachers had supervised the sessions more closely and helped them discipline the Year 7 students when required. One leader noted, for example, that:

Greater support should be given to the leaders in the area of discipline from the homeroom teachers (Peer leader; Theme 2: Program Organisation).

It is important to recognise that only one Year 7 student identified Theme 2 in the open-ended survey. Most likely, the disparity of responses between Year 7 and Year 10/11 student responses was due to the obvious difficulty for Year 7 students in being aware of any problems that occurred in the provision of teacher support and debriefing. Clearly, the peer support leaders were in a better position to make judgements about the program in this domain than the Year 7 students.

**Focus group discussions.** Consistent with the findings from the open-ended questions, the second most prevalent issue identified from the peer leader focus group discussions concerned problems in program organisation (Theme 2). This theme was identified in five out of seven of the discussion groups conducted with the peer support leaders. They reported that the program was “poorly organised” in that they “got sheets too late, only just before” the session was to start. Furthermore, they indicated that there was deficiency of teacher support with some complaining that they received “no debriefing” at all.

**Summary.** These results suggest that there were problems in the implementation of the program. A number of the peer support leaders pointed out
that they weren’t adequately prepared for the sessions. Furthermore, some leaders reported that they received little or no debriefing at the conclusion of each session, which could have prevented any minor problems from becoming exacerbated. A number of the leaders also indicated that they had difficulty dealing with misbehaving students. These students suggested that they could have carried out their role much more professionally and adequately if the teachers were present during the sessions.

**Theme 3: Peer Support Leaders**

*Open-ended questionnaire items.* A small number of Year 7 students indicated that they had a problem with one or more of the peer support leaders (Theme 3). For example, one student noted that:

One of my leaders should be jailed for life for being so mean, only one of them though (Year 7 student; Theme 3: Peer Support Leaders).

Others said that:

Some of our leaders are not very helpful (Year 7 student; Theme 3: Peer Support Leaders).

Should have leaders that aren’t shy (Year 7 student; Theme 3: Peer Support Leaders).

*Focus group discussions.* As with findings from the open-ended questionnaire, a prevalent issue that was raised in the focus discussion groups conducted with Year 7 students concerned the efficacy of the peer support leaders (Theme 3). This theme was mentioned in 15 out of 17 of the Year 7 focus discussion groups. Similar to the types of comments made in the open-ended survey, students pointed out that:

Leaders would boss you around (Year 7 focus group discussion; Theme 3: Peer Support Leaders).

My leaders were shy and weren’t explaining things properly (Peer leader focus group discussion; Theme 3: Peer Support Leaders).

However, what emerged from the focus group discussions, that didn’t emerge from the open-ended survey responses, was that the major problems with the leaders was their apparent lack of organisation in running the session and their difficulty in
controlling the group. The following comments from Year 7 students are illustrative of this view:

They weren’t organised, didn’t know what to do, they just sat and talked (Year 7 focus group discussion; Theme 3: Peer Support Leaders).

Leaders didn’t know what they were doing (Year 7 focus group discussion; Theme 3: Peer Support Leaders).

Obviously such comments are consistent with those made by the peer support leaders themselves, who complained that the teachers did not properly prepare them for the sessions.

Summary. These results suggest that some of the leaders may not have been committed in doing their utmost to make the program a success. However, this may well have been a consequence of the aforementioned deficiency in support received by the leaders in carrying out their role. Notably, the Year 7 students noticed that the leaders were not adequately prepared for the sessions, which is concordant with the comments made by the peer support leaders themselves. These results emphasise the importance of effectively preparing the leaders for the sessions so that they serve as organised and committed role models.

Theme 4: Time of Commencement

Open-ended questionnaire items. In the responses of approximately one in eight peer support leaders who identified problems, an issue emerged concerning program commencement time (Theme 4). Owing to the design of the present research project, none of the participating schools was able to start the program at the commencement of the school year as T1 baseline surveys needed to be completed first. Furthermore, because this was the first time the program had been conducted in the participating schools, they were less organised in starting the program as early as what they could probably do in the future. Year 10/11 students stated that:

It needed to begin right at the start of the year (Peer leader; Theme 4: Time of Commencement).

I think that holding the program earlier in the year would have been more beneficial to Year 7 students (Peer leader; Theme 4: Time of Commencement).
This theme was not identified at all in the open-ended questionnaire responses of Year 7 responses.

**Focus group discussions.** In accordance with the findings from the open-ended survey, a problem that was raised in the discussion groups conducted with the peer support leaders was that the program “should have been done earlier” (Theme 4). This theme was identified in two out of the seven peer leader discussion groups. However, in contrast to the findings from the open-ended survey, Year 7 students also identified this theme in the focus group discussions. As with the peer support leaders, the Year 7 students indicated in 4 out of the 17 discussion groups that it would have been “better if the program started earlier” because by the time it commenced the students already “knew each other”.

**Summary.** These results emphasise the importance of commencing the peer support program right at the beginning of the school year. As the first weeks into the commencement of secondary school are particularly stressful, students would probably benefit most if it the program could commence immediately. Indeed, now that the participating schools have become familiar with the program, they should be able to commence the program earlier next year.

**Theme 5: Disciplinary Problems**

**Open-ended questionnaire items.** An important issue that surfaced from the responses of the peer support leaders was that they had difficulty controlling students who would not cooperate in the group (Theme 5). This theme was reported by one in six of the peer leader responses. The following quotes reported by Year 10/11 students are illustrative of this theme:

The students did not behave and sit down to complete the work given (Peer leader; Theme 5: Disciplinary Problems).

My partner and I had trouble keeping them quiet, mixing genders and making them contribute positively with activities (Peer leader; Theme 5: Disciplinary Problems).

Some students were persistent in making the peer support sessions a horror to do (Peer leader; Theme 5: Disciplinary Problems).

As noted previously, some students indicated that they would have liked greater assistance from their teachers in managing or controlling the group.
Focus group discussions. Consistent with the findings from the open-ended survey, the peer support leaders indicated that they had difficulty controlling the Year 7 students. In three out of seven of the group discussions, the peer leaders indicated that the Year 7 students were “loud and mucking up” and that they “didn’t cooperate”. One peer leader noted that “the Year 7’s saw me as another student and therefore, I did not get the respect that the teachers get”.

One group of students suggested that if the activities were more fun and interesting the students may have been more cooperative:

Felt like a teacher as it was boring and had to discipline the kids. Need to draw the students into the program in the first session (Peer leader focus group discussion; Theme 5: Disciplinary Problems).

A number of the focus discussion groups conducted with the Year 7 students also identified this theme, noting for example that:

The leader couldn’t settle the class down if it got out of hand (Year 7 focus group discussion; Theme 5: Disciplinary Problems).

They couldn’t control us sometimes...should have more control over the whole group (Year 7 focus group discussion; Theme 5: Disciplinary Problems).

Summary. These results suggest that peer leaders may benefit from increased teacher presence during the sessions so that they may help to address disciplinary problems if necessary. The leaders may also profit from supplementary training in group management procedures.

Theme 6: Program Length

Open-ended questionnaire items. A small number of students suggested that changes be made to the length of the program (Theme 6). While two Year 7 students suggested that the program “should be longer”, one peer support leader indicated that the program need not run for so long.

Focus group discussions. Issues related to the length of the program were also raised in the focus group discussions with Year 7 students (Theme 6). This theme was raised in almost one third of the discussion groups conducted with Year 7 students. Student responses were equally divided with half suggesting the program should “have more sessions”, while the other half indicating that it was “too long”.

307
This theme was not mentioned in the focus group discussions with the peer support leaders.

**Summary.** While the majority of students were happy with the length of the program, there were a small number of students who would have preferred the program to be lengthened and a small number of students who would have preferred it be shortened. Possibly, if the activities of the program were perceived to be more interesting and fun, more students would have wanted the program to continue. If in the future, enough students do want the program to continue, schools could readily extend the program.

**Theme 7: Group Participants**

**Open-ended questionnaire items.** A small number of students raised an issue about the constituency of the group participants (Theme 7). One Year 7 student stated that they “should be able to be with a group of friends”. On the other hand, three peer support leaders suggested that the Year 7 students should not be grouped with people from their class, as illustrated in the following quotes:

The groups should not be taken from their graded classes because that can determine how well they work together (Peer leader; Theme 7: Group Selection).

The classes should be mixed so that students can communicate with people they don’t know (Peer leader; Theme 7: Group Selection).

**Focus group discussions.** Consistent with the findings from the open-ended survey, students made recommendations about the way in which the students should be grouped together (Theme 8). Student responses were equally divided with Year 7 students suggesting that students should be grouped with friends and the peer support leaders suggesting that they should be grouped with people that they did not already know. The following comments made during the focus group discussions are illustrative of these disparate views:

What was not good about the program was that we didn’t have most of our friends in our groups (Year 7 focus group discussion; Theme 7: Group Selection).

The groups had students from the same class...It would have been better if the groups had students from mixed classes so that they could meet more people (Peer leader focus group discussion; Theme 7: Group Selection).
Summary. The responses of Year 7 students probably reflect their instability to the newness of the school and its environment and thus, they would have preferred to be with people who they already know. However, the peer support leaders, who are acutely aware of the program and its outcomes, recommended that the students should not be grouped with people from their own class. Indeed, to maximise the number of new friendships formed among the Year 7 students, peer support leaders suggested that Year 7 students be grouped with people they did not already know.
Additional Comments Made By Year 7 Students About Their Peer Support Leaders

A total of 308 Year 7 students responded to the final question in the open-ended questionnaire, which asked students they would like to make any other comments about their peer support leaders. Students’ responses to this question were coded as positive, negative or neutral. The results from this analysis demonstrated that the vast majority of Year 7 students made positive comments about one or both of their peer support leaders (see Table 9.7). The following example quotes by Year 7 students are illustrative of their views about their peer support leaders:

They were great! They were friendly, helped me out when I needed it and we became great friends.

My leaders were great. I had fun with them. I will always remember them as inspirational leaders.

They were brilliant. I absolutely loved them. They were kind, friendly and helpful to me. They would make great teachers because they were so nice and patient and friendly.

My peer support leaders were heaps good. You should give them a plaque that’s how good they were.

Both my peer support leaders were very nice to me and treated me as their best friend.

A number of Year 7 students indicated that the peer support leaders helped to make the program enjoyable. The following comments are illustrative of this view:

The peer support leaders did the best to make the program fun.

They made peer support fun.

They were funny and kind so they made it fun.

Furthermore, some students suggested that they remained friends with the peer support leaders even after the program was completed.

They were nice and I still talk to them.

I have gained so much trust and respect in my leaders that they are now my friends.
They were very nice and taught me that there is always a helping hand if I need it.

Table 9.7

*Frequency (and Percentage) of Responses from Year 7 Students (N = 308) About their Leaders coded as Positive, Negative and Neutral*

<table>
<thead>
<tr>
<th>Response</th>
<th>Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Positive</td>
<td></td>
</tr>
<tr>
<td>Great / Friendly / Cool</td>
<td>246 (80.0)</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Lack of organisation / Lack of control / Boring / Mean</td>
<td>46 (18.1)</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Talk a lot / Got lollies / Got out of class</td>
<td>16 (1.8)</td>
</tr>
</tbody>
</table>

These results suggest that most Year 7 students had a good opinion of their peer support leaders. Students reported that their leaders were “friendly”, “kind” and “helpful”. Students also indicated that the peer support leaders made the program an enjoyable experience. Perhaps, if it was not for the leaders, the program would not have been nearly so pleasurable. Finally, some Year 7 students implied that they remained close to their leaders even after the completion of the program suggesting that long-term effects resulted from the program.
Summary

The current chapter has provided a comprehensive examination of students’ perceptions of the peer support program. A combined quantitative-qualitative approach was employed in view of recent developments in program research that have highlighted that quantitative and qualitative methods can complement each other in ways that both consolidate findings and shed light on issues that were previously seen to be best addressed by one and not the other. This multi-method approach resulted in elucidating students’ views of the strengths of the peer support program. The utilisation of Year 10/11 students as peer support leaders and the establishment of small peer support groups appear to be two considerable strengths of the program. The results in this chapter also suggested, however, that the program is not without its limitations. For example, the quantitative and qualitative data identified problems pertaining to the activities of the program and the manner in which the program was coordinated within the schools.

The qualitative data was particularly important in identifying the perceived benefits of the program for Year 7 students and the peer support leaders. The results found benefits for the Year 7 students in a variety of domains: Student connectedness, problem solving ability, sense of self, optimistic thinking, school citizenship, and adjustment to secondary school. The qualitative results indicated that the peer support leaders had also benefited from taking part in the program, with gains being made in the following domains: Leadership ability, peer relations, sense of self, teacher relations and responsibility. The current chapter provides strong evidence of the value of combining quantitative and qualitative research methods in program research. These findings, coupled with the findings of the previous quantitative studies provide consistent evidence that the program has important benefits for both the Year 7 students and the peer support leaders.
CHAPTER 10

DISCUSSION AND IMPLICATIONS FOR FURTHER RESEARCH AND PRACTICE

Introduction

The primary purpose of the present investigation was to empirically evaluate the effectiveness of a secondary school peer support program in order to increase our understanding of the key strengths and limitations of peer support, as well as to ascertain its benefits in easing the transition to adolescence and secondary school. The first concern of this study was to ensure that the measures employed in the present study provided a sound empirical basis upon which the effectiveness of the peer support program could subsequently be examined (Study 1). The second objective was to provide a comprehensive examination of the impact of a peer support program on Year 7 students (Study 2) and on those who served as peer support leaders (Study 3). Finally, students’ perceptions of the content, process and value of the program were also investigated using a combination of quantitative and qualitative research methods (Study 4). The intention of the current chapter is to discuss the key findings of this investigation in relation to its original objectives and previous research. The strengths and significance, as well as the limitations of the present thesis, are discussed. Further, recommendations for educational practice and suggestions for further research emanating from the project’s findings are outlined.

Discussion of Findings

The current research has attempted to address some pivotal questions with regards to the efficacy of peer support programs for secondary school students. In this section key findings of the research are discussed and plausible interpretations put forth.

Psychometric Properties of Measurement Instruments

Over the past decade, there has been increasing interest in the development of empirically supported interventions in psychology and education (Kratochwill & Stoiber, 2000). However, research in this area has continued to be plagued by anecdotal evaluations and the use of instrumentation with unsubstantiated
psychometric properties. As a result, researchers have emphasised the need to develop and select instrumentation with demonstrated sound psychometric properties and apply sound research design so that intervention research can be improved (Zaslow & Takanishi, 1993). Study 1 was specifically designed to address these needs and advance current research practice by identifying, developing and evaluating psychometrically sound measurement instruments of relevance to the present investigation for use with secondary school students. As this study was the first large-scale test of each of the instruments, it was critical that their psychometric properties be thoroughly evaluated.

**Reliability and factor structure of the instruments.** Measures designed to assess self-concept (SDQII-S), life effectiveness (ROPE), coping strategies (CSI-S), perceptions of bullying (APRI-A), social support (Support Scales) and enjoyment of school were administered to a large sample of Year 7 and Year 10/11 students. Coefficient alphas for each of the instruments’ subscales were used to estimate internal consistency. The results demonstrated that the instruments have good reliability for both younger (Year 7) and older (Year 10/11) students, with the possible exception of the pro-victim scale from the APRI-A which had moderate reliability. Where it can be compared, the coefficient alphas reported in the current study are comparable to those achieved in previous research (e.g. Amirkhan, 1990; Ellis, Marsh, & Richards, 2002; Marsh, Ellis, et al., in press; Richards et al., 2002).

Clear evidence was also found for the factor structure of the instruments. The CFA results for each instrument identified the a priori factors that each instrument was designed to measure. The goodness of fit indices for each model were reasonable and the factor loadings were consistently high. Furthermore, the factor correlations showed satisfactory discrimination between the scales of each instrument. After each instrument was examined separately, a final, large 31-factor CFA was conducted which included scales from all instruments in order to assess the factor structure and degree of discrimination between scales. This CFA demonstrated that items loaded only on the factors that they were designed to measure and importantly, the goodness of fit indices produced from this analysis indicated that the a priori 31 factor model provided an excellent fit to the data. The factor loadings for each of the items were statistically significant and consistently high. Furthermore, the factor correlations from this model demonstrated satisfactory discrimination between
each of the scales. Considering the large number of the scales that were included in this model, and which are closely related by nature, the results from this analysis provide strong support for the discriminant validity of all scales measured in this investigation.

CFA’s were also conducted to examine age-related differences in the structure of the measurement instruments. The results demonstrated that the factor structure for the instruments were very similar for Year 7 and Year 10/11 students. Thus, the instruments are suitable for use with both younger and older secondary school students.

The results produced from the CFA inclusive of all 31 scales also provided an opportunity to examine the interrelations among the factors. The key findings of the factor correlations, as well as their implications for research and practice, will be discussed in the following sections.

**Multidimensionality of self-concept.** While contemporary theory and research on self-concept has highlighted the importance of taking a multidimensional perspective of self-concept (see Chapter 2), the unidimensional perspective continues to dominate in a number of areas of psychological research. Researchers who take a unidimensional perspective believe that self-concept can be understood just as well from a single global domain (i.e., global self-esteem) as from a multidimensional perspective (i.e., measurement of multiple facets of self-concept). The results of the present research have important implications for our understanding of the structure and measurement of self-concept.

Consistent with previous SDQ research, the CFA clearly identified all eleven factors that the SDQII-S was designed to measure, which offers support for a multidimensional model of self-concept for secondary school students. Furthermore, the pattern of correlations between the 11 SDQII-S scales and the other instruments offers additional support based on external validity criteria into the utility of conceptualising self-concept as a multidimensional construct. The differential pattern of relations found in the present research between SDQII-S scales and other instruments for adolescents provides strong new support for the usefulness of a multidimensional perspective of self-concept in intervention research. For example, the negative correlations between the CSI-S problem avoidance scale and the SDQII factors ranged from as low as -.07 for the physical ability self-concept scale to as
high as -.48 for the emotional stability self-concept scale. Notably, this moderate correlation between the SDQII-S emotional stability scale and CSI-S problem avoidance scale is consistent with previous research suggesting that avoidant coping strategies are associated with psychological distress and problems in adaptation (Chan, 1995; Dumont & Provost, 1999; Ebata & Moos, 1995; Herman-Stahl, Stemmler, & Peterson, 1995). In addition, support for the multidimensional perspective was evident for the CSI-S problem avoidance scale which was moderately negatively correlated with some SDQII-S factors including global self-esteem and more substantially negatively related to other SDQII factors (emotional stability, same-sex relations and honesty/trustworthiness), but nearly uncorrelated with physical ability, physical appearance and math self-concept factors. Consequently, the results suggest that the pattern of relations is more complex and informative when self-concept is examined from a multidimensional rather than a unidimensional perspective.

These results also demonstrate that reliance on the global self-esteem scale cannot account for the within-construct complexity of the self-concept construct and as such, facilitate the examination of the rich tapestry of relations that specific domains of self-concept shares with psychological constructs. However, in accordance with recommendations made recently by researchers (Marsh, Craven, & Martin, in press; Marsh, Parada, & Ayotte, 2004), although the results of the present investigation clearly provide support for the multidimensional theoretical conceptualisation of the self-concept construct, they do not imply that global self-esteem should be excluded from analysis. Rather, self-esteem should be utilised as one of a multiplicity of multidimensional self-concept factors rather than as sole measure in order to effectively understand the relations between self-concept and other psychological constructs.

**Coping Strategies.** Theorists have conceptualised coping strategies as an important moderator between school transition and psychological well-being. Coping strategies centred on problem solving and support seeking have been linked with more positive adjustment to secondary school, while avoidant strategies have generally associated with poorer adjustment (see Chapter 2). Consistent with these predictions, results from the present thesis found that both problem solving and support seeking styles were positively related to specific aspects of school
adjustment and psychological well-being. Problem solving strategies were moderately associated with global self-esteem, self-confidence, enjoyment of school and overall effectiveness in life. Interestingly, problem solving was also moderately related to open thinking and time efficiency. These results suggest that open thinking may be an important skill required for successful problem solving, which may enable students to consider each of the possible alternatives solutions to resolving problems. Further, the results suggest that the type of individuals who employ problem-solving strategies are those that make efficient plans and utilisation of time.

In accordance with theoretical predictions, support seeking was also moderately related to enjoyment of school and self-confidence, though the magnitude of the relations was less strong than the relations of problem solving to enjoyment of school and self-confidence. Possibly, these results are providing evidence about the relative importance of these coping strategies on adolescent adjustment. Specifically, the results suggest that problem solving strategies may be more instrumental than support seeking coping strategies in protecting youth against maladjustment. If this is the case, the findings from this study concur with previous theory which perceives emotion-focused coping (e.g., ventilating feelings, crying or talking to a friend) as less effective than problem-focused coping because the former focuses on the symptom rather than the cause (Hauser & Bowlds, 1990; Patterson & McCubbin, 1987).

It is important to highlight, however, that the moderate sized correlation between problem solving and support seeking strategies suggests that perhaps individuals probably use a combination of these strategies, but with a primary emphasis on one approach. In support of this idea, Hauser and Bowlds (1990) noted that both emotion-focused and problem solving coping strategies are used in almost all stressful situations. For example, seeking emotional support may also allow for direct action (problem solving coping) by allowing the individual to discover new insights into and possibly resolve the problem.

In accordance with previous research (see Chapter 2), problem avoidance was moderately negatively correlated with emotional stability, global self-esteem and stress management. These results provide support for the view that avoidant coping strategies (e.g., denial and distraction) are not instrumental in helping students resolve problems. It appears that adolescents who adopt these types of strategies will
not be effective in protecting themselves against stress and, in consideration of previous research associating low emotional stability with depressive symptoms (e.g., Marsh, Parada, & Ayotte, 2004), may be at risk of developing psychological problems. This is consistent with previous research that has found that adolescents who employ avoidant coping strategies are more likely than those who use problem solving coping strategies to develop psychological distress and problems in adaptation (Chan, 1995; Dumont & Provost, 1999; Ebata & Moos, 1995; Herman-Stahl, Stemmler, & Peterson, 1995).

**Social Support.** Family and peer support has also been conceptualised as an important factor for healthy adaptation (see Chapter 2). In the present study the results were consistent with this contention, with both parent and peer support being moderately related to global self-esteem and self-confidence. However, the size of the relation between the support scales and measures indicative of adjustment were generally higher for parental support than peer support. Thus, in correspondence with previous research (Helsen et al., 2000; Printz, Shermis, & Webb 1999; and Sim, 2000), these results suggest that support from parents may be a better indicator of positive emotional and behavioural adjustment than peer support. Alternatively, it may suggest that peers serve as a secondary coping resource (i.e., their help is solicited when the family proves non-supportive). The relatively low correlation between parental and peer support cited in the present study is compatible with this second interpretation and previous theory contending that school-based supportive ties may play a compensatory role for adolescents with low levels of family support (e.g., DuBois, 1992; Gauze, Bukowski, Aquan-Asse, & Sippola, et al., 1996).

The results from this study also demonstrated that peer support was relatively strongly related to same-sex relations, social effectiveness, cooperative teamwork and leadership ability. These results appear to be reflective of Printz et al.’s (1999) contention that soliciting support from peers requires social competencies.

**Self-Efficacy.** Within the last decade, researchers have become increasingly interested in the role of positive perceptions of the future on adjustment (see Chapter 2). In accordance with previous theory and research, self-efficacy was moderately to strongly associated with self-confidence, global self-esteem and enjoyment of school. Students who scored highly on self-efficacy were also more likely to report using problem solving and support seeking coping strategies, which corresponds with
previous research linking optimism with active coping efforts (see Carver & Scheier, 1999, for reviews).

**Summary of Discussion of Psychometric Properties of Instruments**

The central finding that emerged from this study was clear support for the measures employed for the present research to assess specific aspects of secondary school students' self-concepts, psychological well-being and adjustment to the secondary schooling context. Systematically rigorous testing procedures were applied which conclusively demonstrated strong psychometric properties for each of the instruments in terms of reliability and factor structure. Given that there is a paucity of reported reliability and validity information for many measurement tools utilised in psychology and education research (e.g., Byrne, 1996), the findings reported in this study make an important contribution to advancing psychological research from a measurement perspective. Demonstration of the sound psychometric properties for measures assessing such a wide range of psychological outcomes (including self-concept, life effectiveness, coping strategies, perceptions of bullying, social support and enjoyment of school) ensures that researchers and practitioners can confidently utilise these instruments in future research with secondary school students. The findings also offer further support for the research and theory upon which these instruments are based. The current research has enabled exploration of a rich tapestry of relations that has only been alluded to in previous research.

**Impact of the Peer Support Program on Year 7 Students**

Over recent years, researchers and practitioners have become increasingly interested in the potential of peer support programs for alleviating many of the problems faced by youth during adolescence and the transition to secondary school. Study 2 was designed to advance current research in this area by examining the effects of a peer support program on a wide-range of outcomes for Year 7 students. Students' personal perspectives of the peer support intervention were also examined by means of a mixed method approach (Study 4).

A summary of the results for each scale in Study 2 predicted to be affected by the intervention is presented in Table 10.1. As can be seen, the results of Study 2 demonstrate that the intervention was largely successful in achieving its goals of
enhancing Year 7 students’ school self-concept, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility for the future. A particularly interesting finding was the discovery of several “sleeper effects” in Study 2, whereby the effects of the intervention appear to have been initiated during the program and continued to develop over time. In the next section, the immediate and follow-up effects of the intervention are discussed in relation to the original objectives of the program.

Table 10.1.

**Summary of Study 2 Results: Effects of the Intervention on Year 7 Students at Time 2 and Time 3**

<table>
<thead>
<tr>
<th>Predicted Effects</th>
<th>Post-Intervention Test Occasions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 2</td>
</tr>
<tr>
<td><strong>School Self-Concept</strong></td>
<td></td>
</tr>
<tr>
<td>General self-concept</td>
<td>✓</td>
</tr>
<tr>
<td>Verbal Self-concept</td>
<td>✓</td>
</tr>
<tr>
<td><strong>School Citizenship</strong></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully Attitudes</td>
<td>✓</td>
</tr>
<tr>
<td>Pro-Victim Attitudes</td>
<td>✓</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Sense of Self</strong></td>
<td></td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>-</td>
</tr>
<tr>
<td>Global Self-Esteem</td>
<td>-</td>
</tr>
<tr>
<td><strong>Connectedness</strong></td>
<td></td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>-</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>✓</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td>-</td>
</tr>
<tr>
<td>Peer Support</td>
<td>-</td>
</tr>
<tr>
<td><strong>Resourcefulness</strong></td>
<td></td>
</tr>
<tr>
<td>Problem-Solving Strategies</td>
<td>-</td>
</tr>
<tr>
<td>Support Seeking Strategies</td>
<td>-</td>
</tr>
<tr>
<td>Problem Avoidance Strategies</td>
<td>-</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>✓</td>
</tr>
<tr>
<td>Coping with Change</td>
<td>-</td>
</tr>
<tr>
<td>Time Efficiency</td>
<td>-</td>
</tr>
<tr>
<td>Stress Management</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Sense of Possibility</strong></td>
<td></td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* ✓ = Significant positive impact of the intervention (At Time 2 ✓ denotes a significant immediate effect of the intervention; At Time 3 ✓ denotes either that the positive effects of the intervention identified at Time 2 were also maintained at Time 3 or in the absence of a significant effect at Time 2, that the intervention evidenced a delayed-positive effect at Time 3.*
School self-concept. Consistent with the aims of the peer support program (see Chapters 3 and 4), the results from Study 2 found that students in the experimental group reported significantly higher general school and verbal self-concepts at the conclusion of the intervention than students in the control group. The results of this study also demonstrate that the benefits of the program on verbal and general school self-concepts were retained over time (i.e., from Time 2 to Time 3). As anticipated, maths self-concept, which was less relevant to the goals of the program, was unaffected by the intervention. Hence, the findings of Study 2 demonstrate the importance of considering the multidimensionality of self-concept in intervention research, rather than relying solely on global measures of self-concept and offer support for the soundness of employing a construct validity approach to study intervention effects.

School citizenship. The findings of Study 2 suggested that the peer support program enhanced responsible citizenship among students. Consistent with the aims of the program, students in the experimental group reported significantly lower pro-bully attitudes and higher honesty/trustworthiness following the intervention than students in the control group. These results are consistent with the recent research of Menesini, Codecasa, Benelli, & Cowie (2003) which has highlighted the potential of peer support systems in effectively preventing the escalation of young adolescents’ negative behaviours and attitudes that often develop around this age. Furthermore, the results indicated that the effects of the intervention on pro-bully attitudes became stronger over time. Perhaps time was needed for students to internalise and apply new pro-bully attitudes. The apparent sleeper effect for pro-bully attitudes is promising as it suggests that the peer support program may generate ongoing improvement in perceptions of bullying over time. Future research is needed to further explore this issue.

Significant aptitude-treatment interactions for the pro-victim scale suggested that the intervention had a significant immediate impact on pro-victim scores for participants with initially low levels in this domain. For the remainder of the participants (i.e., students with medium to high initial pro-victim scores), the effects of the intervention became significant three months later at post-intervention follow-up (i.e., Time 3). These results are suggestive of a sleeper effect for some categories
of students, whereby changes in pro-victim attitudes were initiated during the program and continued to develop afterwards.

The findings of the qualitative component of Study 4 also indicated that the intervention altered students’ perceptions of bullying. Results suggested that the peer support program disinclined Year 7 students towards bullying behaviour and encouraged them to be more empathetic towards others. Students explained that they learnt how to deal with problems without resorting to violence and to be more sympathetic and helpful to those who are being bullied. Furthermore, students emphasised that they could seek support from their peer support leaders for help and advice if bullying occurred at a future date. This is particularly important given recent research that has shown that having a friend or supporter reduces the negative effects of bullying for victims (e.g., see Boulton, Trueman, Chau, Whiteland, & Amatya, 1999; Naylor & Cowie, 1999).

Since bullying is recognised as a growing and significant problem in many schools (Healey, 2001), the results of the present research are clearly important. At least one in six Australian students are being bullied at school on a weekly basis (Rigby, 1996), with similar figures demonstrating the pervasiveness of bullying cited for schools around the world (Smith, Morita, Junger-Tas, Olweus, Catalano & Slee, 1999). Interventions to counter bullying in schools are now regarded as a matter of high priority in an increasing number of schools. Yet for the most part, research on school-based interventions designed to counter bullying indicates only limited success (see Chapter 2). Notably, many anti-bullying interventions have provided support services only to those students who seek and therefore self-initiate access to such services (e.g., counselling-based schemes that provide support to victims; see Cowie & Wallace, 2000). While these services have been perceived by bullied students as being helpful, they have not been proven effective in bringing about a decline in bullying behaviour (Naylor & Cowie, 1999). Furthermore, recent research has shown that only a small proportion of bullied students actually use these systems (Cowie et al., 2002), which may be attributable to the stigma associated with taking a problem to a counsellor in contrast to a peer support leader whom they are already familiar with and can approach in a less formal manner. Moreover, bullied students may wait until the problem is exacerbated before they consider seeking help.
Alternatively, the peer support program, on which the present research is based, is designed to offer both education and emotional support to all Year 7 students and not just an at-risk group. Indeed, Sharp (1996) suggested that effective anti-bullying interventions are those which prevent bullying from occurring, as well as providing early intervention when it does. Hence the findings suggest that that the peer support program can be a potentially powerful strategy in managing bullying in schools.

In summary, the results of the present investigation provide strong evidence to suggest that the peer support program was successful in its aim of encouraging “positive, socially responsible participation in the school community” (Peer Support Foundation, 2001, p. 6). Therefore, these findings suggest that this type of intervention can play a significant part in enhancing responsible citizenship among Year 7 students and the creation of a secure and caring ethos within the school environment. Changing students’ attitudes towards the bullies and victims is likely to reduce bullying episodes in the school (Marsh, Parada, Craven & Finger, 2004) and hence, improve the school atmosphere. The results of the present investigation suggest that the peer support intervention described in the present investigation is a promising intervention for addressing school bullying.

**Sense of self.** Results from Study 2 indicated that the peer support program had no immediate impact on students’ self-confidence and global self-esteem scores. Perhaps the deficiency of significant effects for self-confidence and global self-esteem was not surprising given the following two considerations. Firstly, previous intervention studies have not generally produced significant immediate impacts on students’ general sense of self in short periods of time (e.g., Hattie, 1992). Perhaps increases in self-confidence and global self-esteem only occur after a prolonged period of time, whereby changes in sense of self are initiated during the program and continue to grow gradually afterwards. In support of this contention, a sleeper effect was evidenced in Study 2 for the self-confidence scale, whereby the effects of the intervention on self-confidence scores became significant over time (i.e., at Time 3).

Secondly, a number of previous studies have shown that students become more negative about themselves after the transition to secondary school (e.g., Eccles et al., 1987; Simmons & Blyth, 1987). Consistent with this view, in Study 2 students’ global self-esteem declined across groups over time. The transition to secondary
school has been characterised as a particularly challenging time as students attempt to adjust to a new school environment replete with many academic and social changes (see Chapter 2). Year 7 students, who were the oldest students at their former school (i.e., in Year 6), are now the youngest at their new school, uncertain of their roles and the surrounding environment (see Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). As these students are faced with such tremendous change, it is not surprising that their self-esteem would be lower following the secondary school transition. Although the peer support intervention is designed to buffer declines in sense of self by providing students with additional support and information about the school, undoubtedly many will—in the short-term at least—still feel uncertain and unconfident in their new environment. Perhaps as the adjustment proceeds, the positive effects of the intervention will become more evident, with disruptions to self-confidence and self-esteem being less long-lasting than for those in the control group.

The results of Study 4 are also consistent with the contention that the intervention initiated positive changes in students’ sense of self. The qualitative data revealed that program helped Year 7 students to understand themselves and improved their self-confidence. A number of students explained that the program helped them to value themselves for who they are and to have the confidence to be themselves and not to be influenced negatively by others. These results are important as researchers and practitioners consider that people with a strong positive sense of their own worth are able to make positive and life enhancing decisions both in and out of school (Kaplan, 1995).

In summary, although the results from the quantitative results of Study 2 were modest, the qualitative data from Study 4 provided clear evidence for improvements in self-understanding and self-confidence as a result of the program. Overall, the findings suggest that developments in sense of self were initiated during the program and continued to develop gradually afterwards. Further research is needed to elucidate these findings.

**Connectedness.** Study 2 provided partial support for the capacity of the intervention to enhance student connectedness. Following the intervention, students in the experimental group reported higher opposite-sex relations self-concept than the control group and increases in this domain were retained over time. Further tests
examining aptitude treatment interaction effects, indicated that students with initially low levels of opposite-sex self-concepts benefited especially from the intervention. The results for opposite-sex relations self-concept most likely occurred because the majority of peer support groups in the present research consisted of a combination of male and female participants which gave students’ the opportunity to interact and form friendships with members of the opposite sex. Furthermore, the Peer Support Foundation (2001) claims that the program promotes “gender equity” and develops students’ “competencies which enhance the quality of their relationships with others” (p. 6). Alternatively, in contrast to the aims of the program, Study 2 found little evidence for enhanced same-sex relations self-concept following the intervention. Possibly, by the time of the commencement of the program in the present research, a number of the Year 7 students had already formed friendships with members of their own sex within their year group, and so reported little change in same-sex relations self-concept at the conclusion of the program.

In addition to enhancements in opposite-sex relations, Study 2 revealed that between the end of the program and follow-up students reported significant gains in perceived peer support and cooperative teamwork. These apparent sleeper effects suggest that the program triggered improvements in these domains. However, future research needs to clarify these findings.

The qualitative results of Study 4 provided particularly strong evidence of improvements in student connectedness. The most frequently reported benefit by Year 7 students was that the program helped them to make new friends and become closer to old friends. Students reported that not only had they been given the opportunity to become closer to students in their own year group, but that they had also been given the opportunity to interact and form friendships with older Year 10/11 students. A number of these students also explained that their peer support leaders served as mentors, someone who they could look up to and turn to for help and advice. In addition, various Year 7 students indicated that the program had helped them to understand others and their feelings. In support of the quantitative findings of Study 2, Year 7 students also reported that the program initiated positive changes in cooperative teamwork. In contrast, Study 2 found no evidence of significant increases in cooperative teamwork for the experimental group. Perhaps,
the quantitative measure was not fully appropriate to detect changes in cooperative teamwork following the intervention.

Taken together the results of the present research suggest that the peer support program was largely successful in its aim of enhancing student connectedness. The intervention appears to have helped students to make new friends (in particular, apparently with members of the opposite sex), understand others and their feelings, cooperate effectively in team situations, and feel supported by their peer group. These results are noteworthy as positive peer relations have been found to be important to the development and continued maintenance of social, emotional and mental well-being (e.g., Benard, 1991; Bukowski, Newcomb, & Hartup, 1996; Ladd, 1990). Benard (1991) also found that students who feel supported and cared for by others report feeling more efficacious in making healthy informed decisions and displaying features of resiliency to potential life stressors.

Resourcefulness. Study 2 provided evidence that the intervention had a positive impact on students’ resourcefulness, particularly for open-thinking and stress management. In accordance with the aims of the program, students in the experimental group reported significantly higher open thinking and stress management scores after the program than students in the control group. Furthermore, the increases in these domains were found to be stable over time. The results of Study 2 also suggested that the intervention initiated positive changes in time efficiency scores. The results were suggestive of a sleeper effect, whereby changes in time efficiency were initiated during the program and became evident after a few months. Perhaps time was needed for students to develop and apply what they had learnt from the program. Future research needs to elucidate this issue.

Study 2 also provided partial support for the capacity of the intervention to enhance students’ coping strategies. Significant aptitude-treatment interactions for the support seeking strategy scale suggested that the intervention had a significant immediate impact on support seeking scores for participants with initially low levels in this domain. Furthermore, the program appeared to initiate significant improvements in problem avoidance scores between the end of the intervention and follow-up (i.e., a sleeper effect).

Consistent with the findings of Study 2, the qualitative data of Study 4 identified improvements in students’ coping skills. A frequently reported benefit by
Year 7 students, as well as the peer support leaders, was that the program taught the Year 7 students how to effectively deal with difficult situations. Furthermore, students explained that they were encouraged to turn to others for support and guidance in the face of difficult situations. Some students also mentioned that the program was beneficial in enhancing their stress management skills.

In summary, the results of the current investigation suggest that the intervention was successful in enhancing students’ resourcefulness. The evidence showed significant immediate effects on open thinking, stress management and support seeking, and delayed positive effects for time efficiency and problem avoidance. The importance of these results is highlighted by contemporary research linking aspects of resourcefulness with academic achievement and college retention (e.g., Johnson, 2000; Lumley & Provenzano, 2003; Nelson & Nelson, 2003).

**Sense of possibility.** Study 2 found that the experimental group scored significantly higher than the control group on the self-efficacy scale at post-intervention follow-up (i.e., Time 3). This apparent sleeper effect suggests that changes in self-efficacy began during the program and continued to develop afterwards. This issue warrants further investigation. Consistent with the findings of Study 2, the qualitative data of Study 4 suggested that the intervention initiated positive changes in students’ sense of possibility. Various students reported enhancements in optimistic thinking following the intervention. They explained that the program taught them to think positively rather than negatively and the important benefits of this way of thinking on their lives. These finding are important because previous research has elucidated a number of benefits for students who expect that they will experience good outcomes in life (see Chapter 2). For example, optimism has been linked with lower incidence of psychological and physical symptomatology (Herman-Stahl et al., 1996; Puskar et al., 1999).

**Effects on other psychological outcomes.** While the intervention had no immediate impact on any other psychological outcomes, there was evidence for delayed positive effects on the emotional stability, active involvement and enjoyment of school scales. The results demonstrated that control group scores on the emotional stability and active involvement scales significantly declined from Time to Time 3, whereas the experimental group students’ scores were fairly consistent across these test occasions. For the enjoyment of school scale, scores for the
experimental group increased between Time 2 and Time 3, while scores for the control group were reasonably stable between these test occasions. Thus, these findings suggest that the intervention may also be promising for enhancing other adaptive psychological outcomes.

Summary of Discussion of Impact of the Peer Support Program on Year 7 Students

The central finding that emerged from the present investigation was clear support for the capacity of the intervention to enhance specific aspects of students’ psychological well-being and adjustment to the secondary schooling context. Sophisticated data analytic procedures were applied which demonstrated that the intervention had a significant immediate impact on students’ school self-concept, perceptions of bullying, honesty/trustworthiness, opposite-sex relations self-concept, open-thinking and stress management. Furthermore, the results revealed that the benefits of the program in each of these domains was retained over a three month period (i.e., from Time 2 to Time 3). Given that there is a paucity of empirical research on the effectiveness of peer support, the findings reported in this study make an important contribution to intervention research. Furthermore, demonstration of the maintenance of gains is a noteworthy finding, because research on most other educational interventions has detected a steady loss of benefits once the program has concluded.

A particularly noteworthy finding in the present research was the detection of significant increases in various outcome measures between the end of the program and follow-up. Evidence for sleeper effects was present for pro-bully attitudes, self-confidence, perceived peer support, cooperative teamwork, time efficiency, problem avoidance, and self-efficacy. These results are very promising as they suggest that peer support programs have the potential to generate an ongoing cycle of personal growth in participants over time.

Impact of the Peer Support Program on Year 10/11 Students

Very little empirical research has been conducted on the benefits of serving as a peer support leader (see Chapter 2). Study 3 was specifically designed to address this issue and advance current research by exploring the effects of a peer support program on the peer leaders themselves. A combination of quantitative and
qualitative research methods were also used to explore students’ perceptions of the peer support intervention (Study 4). In the next section, the effects of the intervention on peer support leaders are discussed in relation to the original outcomes predicted by the Peer Support Foundation (see Chapter 3 and 4).

**Leadership ability.** Consistent with predictions of the current investigation (see Chapter 4), the results of Study 3 found that peer support leaders reported higher leadership ability than students in either of the control groups at the conclusion of the intervention and that the increases in leadership ability were retained over time (i.e., from Time 2 to Time 3). Significant aptitude-treatment interaction effects indicated that peer leaders with lower initial levels of leadership ability especially benefited from taking part in the intervention.

In accordance with the findings of Study 2, the quantitative and qualitative components of Study 4 also showed that the intervention improved students’ leadership ability. In the quantitative questionnaire, 82% of students reported that being a peer leader improved their leadership skills. Further, specific reference to enhanced “leadership skills” was reported in the open-ended questionnaire by one in three leaders and in six out of seven of the focus discussion groups. Students explained that the experience taught them how to give explanations in a clear and understandable way, effectively listen to and manage a group of students, encourage group cooperation, and overcome disciplinary problems in the group. Study 4 also indicated that the program increased the leaders’ organisational skills.

These results indicate that peer support program is a potentially powerful strategy for enhancing the leadership ability of those who serve as peer support leaders. The intervention provides students with the opportunity to develop and display leadership qualities within the school environment. The importance of these findings is highlight by previous research that indicates that student self-perceptions of leadership ability are a significant predictor of future academic and employment success (see Robinson & Horne, 1993).

**School self-concept.** Limited support was found for the enhancement of school self-concepts for the peer support leaders. While the leaders reported significantly higher verbal and general self-concept scores than control group one (i.e., 2001 control group) following the intervention, their scores were not significantly different from control group 2 (i.e., 2002 control group). In essence, the
results demonstrated that 2002 study participants (i.e., both experimental and control group 2 students) reported higher global school and verbal self-concept scores than 2001 study participants. Previous research has identified the possibility of a diffusion effect whereby the control group inadvertently becomes infected (Craven et al., 1991). Given the higher self-concept scores of both the peer leaders and control group 2 in comparison to control group 1 scores, perhaps the effects of the intervention on peer support leaders have inadvertently diffused to control group two participants, such that scores for the peer support leaders are not significantly different to control group 2 participants, but significantly higher than control group 1 participants. This is possible, given that on occasion some of the control group 2 participants were asked by the coordinating teachers to assist with the program when a peer leader became ill or could not attend a session. Future research needs to explore these findings further.

School citizenship. Study 3 indicated that the peer support program enhanced responsible citizenship among the peer support leaders. The results demonstrated that following the intervention the peer support leaders reported significantly lower pro-bullying attitudes and significantly higher pro-victim attitudes and honesty/trustworthiness than students in either of the control groups. In addition, the positive effects of the intervention in these domains were maintained over time. The qualitative results in Study 4 also identified that involvement in the peer support program gave the leaders a satisfying sense of responsibility. The leaders reported on their positions with a sense of pride, noting that they were seen as positive role models for the Year 7 students and accordingly, were required to behave appropriately. These results are consistent with previous research reporting enhanced responsibility and opportunities to act pro-socially for peer supporters (Cowie et al., 2002; Mental Health Foundation, 2002)

The results regarding school citizenship are particularly encouraging and highlight the potential of such programs in promoting positive behaviours and attitudes in those who serve as peer support leaders. In consideration of the aforementioned findings for the Year 7 students, the peer support program illustrates positive effects for participating Year 7 students and the peer support leaders. Consequently, it appears that this type of intervention can play a significant part in
enhancing responsible citizenship among all those involved and hence, create a secure and caring ethos within the school environment.

**Sense of self.** Study 3 results suggest that the intervention enhanced the peer support leaders’ sense of self. Following the intervention, the leaders reported significantly higher self-confidence and global self-esteem scores than students in either of the control groups. The positive effects of the intervention in these domains were retained over time. In accordance with the results of Study 3, the qualitative component of Study 4 suggests that being a leader initiated positive changes in their understanding of self and self-confidence. Students reported that the program helped them to gain a realistic perception about their own personal capabilities and to value themselves as individuals. Various leaders also reported enhancements in self-confidence, and in particular noted increased confidence when speaking in front of a group. These results are consistent with previous research reporting increases in self-confidence for peer supporters (Mental Health Foundation, 2002).

In summary, these findings elucidate the capability of such programs in promoting self-confidence and global self-esteem for those who serve as peer support leaders. In view of the findings for the Year 7 students, the peer support program illustrates comparatively stronger effects on measures of sense of self for the Year 10/11 students than the Year 7 students. Perhaps because the peer support leaders were given the opportunity to practice and develop leadership qualities throughout the intervention, they exhibited earlier gains in sense of self than Year 7 students. Undoubtedly, their selection for the role would have also bolstered their self-esteem. Future research needs to explore this issue further.

**Connectedness.** Study 3 provided evidence to suggest that the peer support program enhanced the leaders’ relations with their peers. Following the intervention, peer support leaders reported significantly higher same-sex and opposite-sex relations self-concept scores than students in either of the control groups and furthermore, that the increases in these domains were retained over time. The qualitative component of Study 4 also suggested that being a peer support leader enhanced their connections with other students. Many peer support leaders reported that the program was beneficial in helping them to better understand others and how to help them. The leaders noted that they learnt how to get along better with their peers, how to empathise with others, and how to help them if they needed it. Some
also reported that the program helped them to make new friends with the Year 7 students. These results are consistent with previous research noting gain for peer supporters in terms of increased understanding of and empathy for fellow pupils (Cowie et al., 2002; Mental Health Foundation, 2002).

**Resourcefulness and sense of possibility.** Limited support was found for the enhancement of resourcefulness and sense of possibility for the peer support leaders. Potentially positive results were found on the open thinking scale, where the leaders reported significantly higher verbal and general self-concept scores than control group 1 following the intervention. However, the leaders’ scores in this domain were not significantly different from control group 2. The findings demonstrated that 2002 study participants (i.e., both experimental and control group 2 students) reported higher open thinking scores than 2001 study participants. Possibly the effects of the intervention may have inadvertently diffused to control group 2 participants, such that scores for the peer support leaders are not significantly different to control group 2 participants’, but significantly higher than control group 1 participants. Future research needs to explore these findings further.

**Effects on other psychological outcomes.** The results from Study 3 found that the intervention produced significant increases in peer leaders’ physical appearance self-concept, social effectiveness and quality seeking in comparison to the control groups. Furthermore, the positive effects in these domains were maintained over time. These results suggest that being a peer support leaders helps students feel more physically attractive, more competent in communicating and operating in social situations, and encourages them to put more effect into achieving the best possible results. Thus, these findings further attest to the promising nature of the peer support intervention to impact positively on a range of desirable psychological outcomes for peer leader participants.

**Summary of Discussion of Impact of the Peer Support Program on Year 10/11 Students**

The results of the present investigation provided clear support for the positive effects of the intervention on the peer support leaders. Sophisticated data analytic procedures were applied that demonstrated that the intervention had a positive impact of the leaders’ leadership ability, perceptions of bullying, honesty/trustworthiness, self-confidence, global self-esteem, same-sex and opposite-sex relations, physical
appearance self-concept, social effectiveness and quality seeking. Furthermore, results revealed that the benefits of the program in each of these domains were retained over a three month period (i.e., from Time 2 to Time 3). Due to the dearth of empirical research on the impact of such programs on peer leaders themselves, the findings of the current thesis make an important contribution to research in this area.

**Evaluation of the Strengths and Weaknesses of the Peer Support Program**

A combination of quantitative and qualitative methods was used in Study 4 to obtain students' personal perspectives of the peer support program. The results from this study provided rich and valuable insights into their views of the potential strengths and limitations of the intervention. Firstly, the results suggest that the utilisation of Year 10/11 students as peer support leaders is a positive feature of the program. The quantitative component of Study 4 indicated that most Year 7 students had a very high opinion of their peer support leaders, indicating that they were easy to talk to, set a good example to follow and were generally well organised for the sessions. Likewise, the qualitative data component of Study 4 demonstrated that Year 7 students had a strong regard for their peer support leaders. They reported that their leaders were “friendly”, “kind” and “helpful”. Furthermore, a number of Year 7 students specified that their peer support leaders helped to make the program an enjoyable experience.

For students who spend the majority of their school life in the classroom being taught by teachers, the peer support program appears to a novelty and a welcome change (Kaye & Webb, 1996). Undoubtedly, the opportunity to get to know an older Year 10/11 student in a relaxed environment is particularly attractive to new Year 7 students. In the qualitative component of Study 4, Year 7 students reported that they had become friends with their peer support leaders and that their leaders would chat with them in the playground. Apparently, this would not be common in schools where peer support has not been introduced. In consequence, these findings suggested that peer support programs provide an excellent mechanism for facilitating social interchange across year groups and hence, creating a positive school climate.

A second positive feature appears to be the creation of small groups in which students could share information with others. The quantitative component of Study 4 revealed that the vast majority of Year 7 students made new friends with other group
members, felt comfortable and accepted within the group, and could talk openly with other group members. These results suggest that the intimacy of the small group enabled the group members to become familiar and comfortable with one another. The findings of Study 4 also revealed that the program helped to strengthen students’ connections. By far the strongest finding to emerge from the open-ended questionnaire responses and focus group discussions was that Year 7 students made new friends with others in the group and with their peer support leaders.

The benefits of working in small teams is now emphasised by many organisations, where employees feel their ideas are being heard and valued. Significant effort is expended on “team building” in order to create a sense of identity and mutual support (see Kaye & Webb, 1996). Mosley (1996) and Cowie and Wallace (2000) also emphasise the benefits of supportive groups. They describe a particular technique known as “circle time” which is used in primary schools to enhance group cooperation, trust and listening skills amongst members of a class group. The peer support program appears to be offering similar benefits with secondary school students. The small group experience allows pupils to establish new friendships, learn empathy for others’ feelings, acceptance of others and tolerance on a range of opinions. It also creates safe place for students to explore any concerns or difficult issues.

The results of the present investigation also suggested, however, that the program is not without its limitations. Firstly, Study 4 identified problems pertaining to the activities of the program. It appears that some of the activities may be directed at an inappropriate age-level for the students and perhaps, involve too many written tasks. The quantitative component of Study 4 revealed that almost 70% of students disagreed with the merit of the activity sheets and exercises of the program. In the open-ended survey and focus discussion groups, a considerable number of students reported that the activities were “boring”, “simple” and “childish”. These results clearly suggest that it may be beneficial for the activities of the program to be revised so as to make the program more interesting and challenging for Year 7 students. Certainly, it is important that the activities of the program are at the appropriate age-level so as to ensure that the students are eager to participate and will remain enthusiastic for the entirety of the program. The students’ qualitative evaluation provided constructive suggestions regarding the activities and exercises of the
program. The majority of adolescents indicated that they liked the physical activities and games and strongly suggested increasing the prevalence of these activities. It does not seem likely that the addition of more physical activities would jeopardise the program’s integrity and could potentially increase interest in, and benefits of, the program.

A second limitation pertained to a deficiency of organisation within the participating schools. Results of Study 4 indicated that a number of the leaders were not adequately prepared by the teachers for the sessions and received little or no debriefing at the conclusion of the sessions. These findings are of particular concern given that debriefing has been noted by Cowie and Wallace (2000) as one of the most significant factors in creating a safe and effective peer support program. Furthermore, they maintain that limitations in support can bring the entire program into disrepute.

Finally, disciplinary problems emerged during the peer support sessions. Study 4 highlighted that a number of peer support leaders had some difficulty in managing and controlling the group. Consideration should be given to students recommendations for increased teacher presence during the sessions. Perhaps the leaders would also benefit from additional training in group management procedures.

**Strengths of the Current Investigation**

The current investigation incorporates a number of strengths in comparison to previous intervention research. Major methodological limitations that have existed in previous research were avoided and new developments in data analytic techniques were effectively utilised. Standardised measurement instruments with demonstrated psychometric properties that include scales specifically relevant to the perceived outcomes of the intervention were employed in the present thesis. CFA procedures were applied which clearly demonstrated strong psychometric properties for each of the instruments in terms of reliability and factor structure. Establishment of the psychometric properties of the measurement instruments was of prime importance in the present thesis because many prior investigations have failed to demonstrate that the instruments employed actually measure the constructs that they were designed to measure. A further criticism of previous research has been the utilisation of instruments that are inadequately matched to the aims of the program (e.g., Hattie,
Marsh, Neill, & Richards, 1997). Clearly, the instruments selected for the current investigation were appropriate as the scales were directly matched to the aims and objectives of the peer support program. In addition, the present research involved a large sample size, which enabled the utilisation of sophisticated data analytic tools and permitted greater generalisability of and confidence in the results.

A strong research design was carefully constructed to effectively examine the outcomes of the peer support program. A longitudinal quasi-experimental design was implemented with control groups and baseline data against which to compare the effects. The current study also utilised new sophisticated statistical analysis tools to examine the results. Multilevel modelling allowed for powerful tests of the effects of the intervention on the experimental versus control groups over time, while controlling for Time 1 measures. This approach, though rare in previous research, was selected as it provides a much richer and more appropriate way of testing longitudinal data than would be possible with single-level approaches which ignore the hierarchical data structure.

A combination of quantitative and qualitative research methods was employed to provide rich insight into students’ perceptions of the program. The qualitative open-ended survey questions and interviews gave students the opportunity to convey their perceptions of the strengths and weaknesses of the peer support program in their own words without being dictated by the structure and content of a likert-type, quantitative approach. The present research clearly demonstrates the richness of information and the complementarity of views that can be obtained through a combination of quantitative and qualitative approaches.

Previous research has suffered from inapt evaluations of the outcomes of peer support programs on both junior students and on the peer leaders. Thus, the current investigation offers important information on the benefits of such programs on incoming secondary school students and on those who serve as peer support leaders. Overall, the results provided clear support for the value of peer support programs for Year 7 students and for the leaders themselves. In consideration of the strong research design employed in the current research, the findings make a unique and valuable contribution to peer support research.
Limitations of the Current Thesis

Several limitations of the present investigation need to be considered when interpreting the findings of the present investigation. The first issue to consider is that most of the data used in the study were derived from self-report. While questionnaires were administered on a number of occasions so as to avoid reliance on a one-off snapshot, the accuracy of students’ responses could not be guaranteed. Nevertheless, research has shown that self-reports about self-related constructs are usually in broad agreement with objective ratings made by others (e.g., see Marsh, 1990, for a review in relation to self-concept). Furthermore, the results from Study 4, which showed that the leaders’ perceptions of the program were generally consistent with the perceptions of Year 7 students, provide some evidence to suggest that students’ self-reports were accurate.

Despite well-planned and well-designed research efforts, educational studies must work within the constraints of the environment (Slavin, 2003). Inevitably, the design of the current study was not impervious to these inherent difficulties. Study 2 and Study 3 utilised a strong longitudinal design but, given logistical and ethical considerations, without random assignment of students to the experimental and control groups. To minimise pre-test differences between the two groups, and avoid potential treats of “diffusion” or “leakage” effects (program effects that radiate to control group participants; see Craven, Marsh, Debus, & Jayasinghe, 2001), the control group consisted of the previous year’s group of students. This design was reasonable, in particular for Study 2, where pre-test differences between the experimental of Year 7 students and the control group of Year 7 students were consistently small.

However, an important issue that emerged from Study 3 was that the pre-test scores of the experimental group of Year 10/11 students were not equivalent to the control groups of Year 10/11 students. Considering that the Peer Support Foundation recommends to schools that leader selection should be based on the efficacy of students’ social skills, leadership ability and contribution to the school community, it was no surprise that that experimental group evidenced non-equivalent scores to the control groups on a number of the outcome measures in the present research at T1. The weakness of non-equivalent groups in Study 3 was not inherent in Study 2 (for Year 7 students), as entire year cohorts were able to serve as experimental and
control groups. Despite this limitation, however, the value of the results from Study 3 can be demonstrated in two ways. Firstly, T1 measures were treated as covariates in models examining the effects of the program (i.e., the "conditional" approach). Using this approach, the effects for experimental group results were compared with those of the control groups while controlling for differences at pre-intervention. Secondly, the results from Study 4, which used a combination of qualitative and quantitative approaches, found similar findings to Study 3.

Another potential weakness of the study is the number of schools included in Studies 2 through 4 (just three schools), due to financial constraints, which limits the conclusions in terms of generalisability of results. Hence the results need to be interpreted cautiously in regard to their generalisability. Despite this, however, it is recognised that most studies in this area are based on only one school. Thus, demonstration that the results generalised over three schools is a positive finding, even through it would have been preferable to have incorporated more schools in the study.

**Implications and Directions for Further Research**

The current investigation has advanced our understanding of the power of a peer support program in assisting students in their passage through adolescence, and elucidated the benefits of such programs on those who serve as peer support leaders. The findings of the current investigation also serve as a catalyst for guiding future research.

First, it is evident from the present examination that researchers need to account for the multidimensionality of self-concept in future research. A multidimensional perspective can lead to a deeper understanding of how the self relates to other psychological constructs and provides more appropriate outcome self-concept measures for intervention research. In addition, it is vital for researchers who are evaluating interventions to ensure that they are employing reliable and valid instrumentation for the particular population under inspection. The identification of theoretically and psychometrically sound instruments in the present investigation resolves the problem for researchers seeking appropriate measures to assess changes in self-perceptions of secondary school students. However, it is essential for researchers to demonstrate the psychometric properties of this instrumentation when
employing it with populations different to those participating in this investigation. Furthermore, it is important for researchers to ensure that they select scales that are relevant to the specific operationalisation of the aims and objectives of programs that they intend to evaluate.

The present investigation suggests that the peer support program can initiate an ongoing personal growth in participants, as evidenced by the positive follow-up findings. Clearly, this very interesting finding warrants further research. A pertinent question is do positive benefits become evident once students have internalised and applied what they have learnt from the program. Future research needs to explore this issue further by incorporating multiple assessments over a longer period of time.

The results of the present investigation are clearly a positive endorsement of the legitimacy and effectiveness of peer support methods in secondary schools. However, the current research is based on only one type of peer support program. A number of different peer support methods have been described in the literature, such as befriending, peer mentoring, and counselling-based interventions. Future research is needed to identify differentiation in effectiveness between these different methods. Furthermore, the present research provides clear support for the positive benefits of such programs on the peer support leaders. However, the non-equivalence between the experimental and control groups in Study 3 needs to be taken into account when appraising the results. Additional research needs to be conducted to further our understanding of the benefits peer support programs have on those who serve as leaders.

Finally, the contribution of the qualitative data to the quantitative findings in the current investigation highlights the importance of the integration of these two approaches in intervention research. Qualitative research can provide a rich insight into participants' perception of the program being investigated. Certainly, the qualitative evaluation conducted in the present research provided a valuable means of elucidating students' perceptions of the strengths and weaknesses of the peer support program and provided convergent support for the outcomes on the self-report measures. Clearly, the use of multi-method approaches could enhance future research findings, particularly in those areas to date that have been dominated by quantitative perspectives.
Implications for Practice

The results of the present investigation highlight the importance of ensuring that the content and activities of any interventions being implemented in schools are at the appropriate age-level of the participating students. It is very important that programs such as peer support provide students with exercises that engage them so as to ensure that they are eager to participate and will remain enthusiastic for the entirety of the program. Asking students to participate in tasks below their age level could have a negative impact on the students who would be feeling that they have "come of age" upon entering secondary school. Furthermore, a deficiency of interest in the program could increase disciplinary problems within the group and thus, impede the success of the program. The results also stress the importance of ensuring that peer support leaders receive sufficient training in group-management skills, so that they can handle any disciplinary problems that might arise.

To maximise the potential for success, school-based interventions also require the continued support of teachers, including those not directly involved in the program. Interventions such as the peer support program result in disruptions to the normal school routine and, thus the support of all staff is necessary. Furthermore, it is imperative that teachers ensure that the peer support leaders are provided with constant support and frequent opportunities to be debriefed about their supporting experiences. As asserted by Naylor and Cowie (1999), “there needs to be recognition that peer supporters themselves need continued support from the teachers if they are to be successful in their own supporting roles” (p. 26). Given that the provision of supervision is necessary, it is imperative for the schools to allocate enough time to the coordination of the program, so that the teachers can effectively brief and debrief the leaders, and supply them with maximum levels of support throughout. Hence the findings of the present investigation offer potential useful directions for enhancing peer support intervention design.

Summary

Overall, the results suggest that peer support programs can obtain notable outcomes and have lasting effects. Furthermore, these programs are of benefit not only to for young participants, but also for older students who serve as peer leaders. This chapter has shown that the results of the present investigation are based upon a
carefully constructed research design to avoid previous methodological flaws plaguing this area of research, and employed sophisticated statistical analyses to conduct powerful tests of the hypotheses proposed.
CHAPTER 11

SUMMARY AND CONCLUSIONS

School-based peer support programs have recently been endorsed as a potentially strong solution in addressing problems faced by young adolescents on transition to the secondary school context. Given that there is a paucity of empirical research on the effectiveness of peer support, the present study sought to examine the effectiveness of a widely-used peer support program in secondary schools designed to ease the transition to adolescence and secondary school. The central finding that emerged from the present investigation was clear support for the capacity of the program to enhance specific aspects of Year 7 students’ psychological well-being and adjustment to the secondary schooling context. A particularly noteworthy finding was the detection of significant increases in various outcome measures between the end of the program and follow-up. These results are promising and suggest that peer support programs have the potential to generate an ongoing personal growth in participants.

The present investigation was also important in elucidating findings that peer support programs can obtain notable outcomes for those who serve as peer support leaders. The results found that the program impacted positively on a range of desirable psychological outcomes for peer leaders and moreover, that the benefits were retained between the end of the program and follow-up. Due to the dearth of empirical research on the impact of such programs on peer leaders themselves, the findings of the current thesis make an important contribution to research in this area.

Facilitating student’s adjustment to adolescence and the secondary school context has become a priority for policy makers, researchers and educators. The present investigation provides solid evidence to suggest that the provision of peer support has the potential to make a significant contribution to schools’ efforts to orchestrate positive outcomes not only for young participants, but also for older students that implement the program. In accordance with the contention of Charlton (1998), the results imply that schools that fail to capitalise on peer support may be forfeiting valuable opportunities to help facilitate students’ psychological well-being and adjustment to adolescence and secondary school.
The current investigation also endeavoured to deliver a new standard of research that would effectively evaluate the peer support intervention and generate further quality research. Research in the area of peer support has been plagued by anecdotal evaluations, the use of instrumentation with unsubstantiated psychometric properties, absence of control groups, as well as a deficiency of evaluation and follow-up. The present thesis was designed to incorporate a sound research design and avoid major methodological limitations that have pervaded previous research. Key strengths of the research design of the study included (a) identifying, developing and evaluating psychometrically sound measurement instruments for use with secondary school students; (b) employing a strong longitudinal, quasi-experimental design to investigate the effects of the program; (c) incorporating control groups and baseline data against which to compare the effects; (d) utilizing a large sample size and participation from several schools; (e) incorporating a synergetic blend of quantitative and qualitative research methods to investigate the effects of the intervention; and (f) conducting sophisticated statistical analyses.

In Study 1, the measurement instruments employed in the current research were rigorously evaluated to ensure that they provided a sound empirical basis upon which the effectiveness of the peer support program could be subsequently examined. Sophisticated analyses successfully determined that the instruments were reliable and valid measurement tools to utilize with secondary school students. This study also made an important contribution in advancing our understanding of the relations between a wide-range of psychological constructs. In particular, the results offered further support for the role of coping strategies, social support and self-efficacy in facilitating adolescent’s school adjustment and psychological well-being, as well as to the necessity of adopting a multidimensional perspective of self-concept.

Study 2 provided a comprehensive examination of the effects of the peer support intervention on Year 7 students. A strong research design was employed and strong statistical analyses were utilised to evaluate students’ responses. The results demonstrated that the intervention led to a significant immediate impact on Year 7 students’ school self-concepts, perceptions of bullying, honesty/trustworthiness, opposite-sex relations self-concept, open-thinking and stress management. Furthermore, the benefits of the program in each of these domains were retained
between the end of the program and follow-up. Evidence of sleeper effects were found for pro-bully attitudes, self-confidence, perceived peer support, cooperative teamwork, time efficiency, problem avoidance and self-efficacy. The results of this study highlight the importance of conducting longitudinal research in order to advance our understanding of the durability and possible improvements that such interventions may produce over time.

Study 3 was designed to advance current research by exploring the effects of the intervention on the peer support leaders. Sophisticated data analytic procedures were applied which demonstrated that the intervention had a positive impact on the leaders': leadership ability, perceptions of bullying, honesty/trustworthiness, self-confidence, global self-esteem, same-sex and opposite-sex relations, physical appearance self-concept, social effectiveness and quality seeking. Furthermore, results revealed that the benefits of the program in each of these domains were retained over time. Thus, the results of this study provided good evidence to suggest that peer support programs also have notable benefits for those who serve as peer leaders.

A combination of quantitative and qualitative methods was used in Study 4 to elucidate students’ personal perspectives of the peer support program. The results of this study provided rich and valuable insights into students’ views of the potential strengths and limitations of the intervention. The utilisation of Year 10/11 students as peer support leaders and the establishment of small peer support groups appear to be two considerable strengths of the program. However, the results identified problems pertaining to the activities of the program and the manner in which the program was coordinated within the schools. Furthermore, there was indication that some of the leaders may have had difficulty in managing and controlling their peer support groups. These findings highlight the need for greater attention to be given to the content and quality of implementation of such programs. In particular, the results stress the importance of ensuring that the program activities are set at an appropriate age and interest level for Year 7 students, that all school staff are committed to implementing the program, and sufficient training and support to the peer support leaders is provided. It would also be desirable for further research to be conducted to identify the key factors that enhance implementation success.
In sum, the findings of the present investigation firstly, hold substantive and methodological implications for researchers studying the effects of interventions. As asserted by Durlak and Wells (1997), a priority for future research is to conduct systematic program evaluations that include assessment of program implementation, include multiple outcome measures with demonstrated psychometric properties, utilize control groups to compare the effects of the program, and employ longitudinal designs with follow-up assessments. The ultimate aim of adopting these measures is for studies to further contribute to the development of knowledge about the types of interventions that are most efficacious in generating successful outcomes. Secondly, the results of the current study are relevant to educational practitioners. They offer support attesting to the promising nature of peer support interventions to impact positively on a range of desirable outcomes for both Year 7 students and peer support leaders. Furthermore, the findings highlight a number of the challenges that may face schools in the implementation of peer support interventions and offer suggested directions for strengthening intervention, including the need to select programs that are stimulating for the target students, which are actively supported by staff members and peer support leaders.
APPENDIX A-1
PROGRAM ACTIVITY: WHO'S WHO AND WHAT THEY DO?

NB: Peer leaders can write their own teacher descriptions. However, they are to be positive.

1. Carries a large pencil case to class containing:
   ✦ a number of coloured whiteboard pens or pieces of chalk
   ✦ a long instrument with marks and numbers on it (ruler)
   ✦ a machine that allows you to input numbers and perform operations (calculator)
   Answer: A Maths Teacher

2. This teacher:
   ✦ plays with lots of glassware of different shapes
   ✦ wears a white coat
   ✦ mixes smelly potions
   Answer: A Science teacher

3. This teacher:
   ✦ uses lots of big words
   ✦ has a love of books
   Answer: An English teacher

4. This teacher:
   ✦ spends their time talking about the 'olden days'
   Answer: A History teacher

5. This teacher:
   ✦ has lots of clay in their room
   ✦ likes colours a lot
   ✦ spends time at galleries
   Answer: An Art teacher

6. This teacher:
   ✦ has plenty of advice about eating
   ✦ smells yummy
   ✦ is practical
   Answer: A TAS teacher
Who's Who Framework

Maths
Library staff
Lab technician
Principal
Administration staff
Student Representatives/Prefects
Special Education Teacher
Careers Advisor
Heads of Departments
Year Coordinators
Art
Science
Welfare
Languages
Roll call teacher
Tutors
Design and Technology
English
Music
History
Sports Captains
Deputy/Assistant Principal
Geography
School Captains
Drama
PDHPE
ESL teacher
Support staff
School Counsellor
Sport
## APPENDIX A-2

**PROGRAM ACTIVITY: HOW DO I FIND OUT ABOUT?**

<table>
<thead>
<tr>
<th>Question</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do I do to order my lunch?</td>
<td>Who do I tell if I need to leave school for an appointment?</td>
</tr>
<tr>
<td>How does sport run in the school?</td>
<td>What sports activities are there?</td>
</tr>
<tr>
<td>Is there a school band?</td>
<td>What other ways can I travel to school?</td>
</tr>
<tr>
<td>How do I get my textbooks?</td>
<td>How do I get a locker?</td>
</tr>
</tbody>
</table>

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX A-3
PROGRAM ACTIVITY: HIGH SCHOOLS A BREEZE HA! (TIME MANAGEMENT)

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 - 7 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - 8 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - 9 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 - 10 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 11 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - 12 noon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 - 1 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 2 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - 3 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - 4 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - 5 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - 6 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - 7 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 - 8 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 - 9 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 - 10 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX A-4
PROGRAM ACTIVITY: HELPFUL HINTS ON MANAGING TIME AND TASKS

Helpful Hints

Include:
- What books to use? This might involve purchase or hire of textbooks, requests from individual teachers for stationery etc (may already have been dealt with prior to enrolment)
- Filling in your timetable and keeping it with you at school (if not in diary) and a copy at home so you know what books to pack in your bag and when to wear your sport uniform
- Packing only what is needed for each day in your bag including homework
- Using a locker if this is possible and remembering to bring the key (it's a good idea to leave the spare with the teacher in charge of lockers)
- Special requirements for technical subjects (woodwork, computing etc), excursions coming up (dates for return of permission slips and payment), when sports days are on or other special days that involve a change to the normal routine
- Knowledge of alternate transport methods available for you to travel to and from school
- How to organise time at home to study and complete assignments
- How to organise my study space at home so that I can complete work efficiently
- Make sure you have books for the next block of lessons
APPENDIX A-5
PROGRAM ACTIVITY: HOW TO NEGOTIATE,
PART A

Changes in Friendship Scenarios

NB: Spaces are provided for you to fill in the names.

Scenarios

1. ________ and ________ have been good friends since Year 1. They have always had a lot of fun together and got on very well. Since starting high school together, things have begun to change. ________ has started going out to the mall with her girlfriends and ________ hangs out with the guys who are into rock music and are putting a band together. They still want to be friends, but their new friendship groups don’t hang out together.

Questions

1. What are the problems this friendship may experience? (3 problems)

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

2. What might be some ways they can work the problems out? (3 solutions)

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

3. Write an ending to your scenario using at least one of the solutions you came up with.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
2. ______ and ______ are at the same high school, however they have been placed in different classes. ______ has made some new friends in her class and wants to sit with them for lunch. ______ finds it hard to make new friends in her class, as they seem to already know each other. She feels awful and wants _______ to sit only with her at lunch.

Questions

1. What are the problems this friendship may experience? (3 problems)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. What might be some ways they can work the problems out? (3 solutions)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3. Write an ending to your scenario using at least one of the solutions you came up with.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
3. _______ and _______ met on their first day in Year 7 and soon became good friends. They hang out at school together and catch the same train to school. At home _______ spends time on his computer especially on the internet playing games. He finds out that a number of students at his school also play games with each other on the computer and is invited to join in. _______ has a computer but is not on the internet and feels that _______ is talking about these internet games more and more.

Questions

1. What are the problems this friendship may experience? (3 problems)
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

2. What might be some ways they can work the problems out? (3 solutions)
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. Write an ending to your scenario using at least one of the solutions you came up with.
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

Peer Support Foundation © 2001, Reproduced with kind permission.
Ending a friendship without becoming enemies

NB: Spaces are provided for you to fill in two names for A & B and one new sport.

A_______ and B_______ had grown up living next door to each other. They had spent lots of time at each other’s houses and had gone through every toy craze together from yo-yos to mountain bikes as well as playing in the local soccer league since they were 6 years old.

A_______ was attending the local high school whilst B_______’s parents had sent him/her to a Sports high school two suburbs away. Two months after starting Year 7 the boys/girls were no longer spending much time together. A_______ was now playing _______ with the local kids while B_______ continued playing soccer but with a graded team with some of the boys/girls from his/her new school.

A_______ and B_______ had thought they would be best friends forever but this did not seem possible as each time they saw one another they felt uncomfortable and found it difficult to think of things to say.

B_______ complained to his/her Mum that he/she felt A_______ was jealous of his/her sporting ability and A_______ complained to his/her dad that B_______ had become full of himself/herself and his/her new friends didn’t like A_______.

Now the boys/girls were not spending any time together except when their two families had a barbecue. They found this so awkward that they would make excuses not to go, even preferring to do homework to avoid spending time together.

B_______’s dad told him/her that sooner or later he/she would have to spend some time together with A_______ as both families were good friends and so perhaps he/she should talk to A_______ and clear the air. Although B_______ did not want to do this, after all it was A_______ who was being difficult, he/she remembered how much fun they used to have playing sport together.

So B_______ went over and talked to A________. It wasn’t easy and he/she nearly lost his/her temper. However he/she found out that A_______ was feeling as awful as he/she was about their friendship ending. The boys/girls chatted and then A_______ began to talk about his/her new sport _______. B_______ listened with interest and then talked about the new soccer league he/she played in.

The boys/girls’ friendship had changed. They no longer did everything together and moved in different friendship groups. They did still see each other regularly at family barbecues and could talk comfortably about sport and laugh over similar experiences.

NB: Remember that even when ending a friendship it can be done in a positive way, when both people involved can be listened to without harsh judgements and angry words.
APPENDIX A-7
PROGRAM ACTIVITY: HOW TO MEET A CHALLENGE

Construction A

Instructions:
Decide what material you need to make your object from the following:
cardboard, straws, paddlepop sticks, paper, glue, sticky tape, ruler, pencil, pair of compasses, scissors
Ask Peer leaders only for materials needed.

Measurements are approximate

Construction B

Instructions:
Decide what material you need to make your object from the following:
cardboard, straws, paddlepop sticks, paper, glue, sticky tape, ruler, pencil, pair of compasses, scissors
Ask Peer leaders only for materials needed.

Measurements are approximate
Construction C

Instructions:
Decide what material you need to make your object from the following:
cardboard, straws, paddlepop sticks, paper, glue, sticky tape, ruler, pencil, pair of compasses, scissors
Ask Peer leaders only for materials needed.

Construction D

Instructions:
Decide what material you need to make your object from the following:
cardboard, straws, paddlepop sticks, paper, glue, sticky tape, ruler, pencil, pair of compasses, scissors
Ask Peer leaders only for materials needed.
Construction E

Instructions:
Decide what material you need to make your object from the following:
cardboard, straws, paddlepop sticks, paper, glue, sticky tape, ruler, pencil, pair of compasses, scissors
Ask Peer leaders only for materials needed.
* Measurements are approximate

Final Product

Peer Support Foundation © 2001, Reproduced with kind permission.
<table>
<thead>
<tr>
<th><strong>Trivia Quiz</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Who is the school principal and where is his/her office?</td>
<td>How do I borrow from the library?</td>
<td>How do I get the textbooks I need for school?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When is sports day and what do I wear?</td>
<td>Who are the school Captain and Vice Captain?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What do I do if I am late to school?</td>
<td>Who is the Year 7 Coordinator and where can I find him/her?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When and where is Peer Support run?</td>
<td>Can I keep my books at school and if so where?</td>
<td>What time does school start and finish?</td>
</tr>
</tbody>
</table>
APPENDIX B-1
PROGRAM ACTIVITY: A PICTURE PAINTS A THOUSAND WORDS

Drawing Cards

Pain  Enthusiasm  Affection
Frustration  Satisfaction  Bliss
Peaceful  Glad  Contented
Envy  Anger  Anxious
Sadness  Surprise  Loneliness
Friendliness  Funny  Frightened

Peer Support Foundation © 2001, Reproduced with kind permission.
### Band Auditions

<table>
<thead>
<tr>
<th>Singer - lead</th>
<th>Singer - backup</th>
<th>Drummer</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Singer" /></td>
<td><img src="image2" alt="Singer" /></td>
<td><img src="image3" alt="Drummer" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyboards</th>
<th>Guitar - lead</th>
<th>Guitar - bass</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Keyboards" /></td>
<td><img src="image5" alt="Guitar" /></td>
<td><img src="image6" alt="Guitar" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guitar - rhythm</th>
<th>Trumpet</th>
<th>Saxophone</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Guitar" /></td>
<td><img src="image8" alt="Trumpet" /></td>
<td><img src="image9" alt="Saxophone" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trombone</th>
<th>Violin - electric</th>
<th>Songwriter</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image10" alt="Trombone" /></td>
<td><img src="image11" alt="Violin" /></td>
<td><img src="image12" alt="Songwriter" /></td>
</tr>
</tbody>
</table>
APPENDIX B-3
PROGRAM ACTIVITY: CHOOSING MY BEHAVIOUR

Choosing My Behaviour
APPENDIX B-4
PROGRAM ACTIVITY: BASIC NEEDS

Basic Needs

The Five Basic Needs are:

- **Survival** - something you do to keep yourself safe and healthy
- **Love and Belonging** - being with people you care about and who care about you
- **Fun** - something you do for enjoyment, while not hurting others
- **Freedom** - being able to make your own decisions
- **Power** - feeling good about who you are and what you believe in

Fill in the column 'What might happen?' for each choice of behaviour.

<table>
<thead>
<tr>
<th>Need</th>
<th>Behaviour</th>
<th>What might happen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survival</td>
<td>A. I am really hungry so I ask a friend to share their food.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. I am really hungry so I steal a chocolate bar.</td>
<td></td>
</tr>
<tr>
<td>Love and Belonging</td>
<td>A. I want to make friends with a new kid so I ask him to go to the skate park after school.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. I want to make friends with a new kid so I make up stories about the other kids so he will hang out with me.</td>
<td></td>
</tr>
<tr>
<td>Fun</td>
<td>A. I go to see the latest movie with my older brother who is driving a new car.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. I make fun of my older brother when he accidentally dents his new car.</td>
<td></td>
</tr>
<tr>
<td>Freedom</td>
<td>A. I spend the gift voucher I got for my birthday on a new wetsuit.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. I leave home at 5 am to go surfing without letting my parents know where I am.</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>A. I proudly telling my friends about my soccer team’s amazing win on the weekend.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. I refuse to kick the soccer ball around the yard with my younger brother.</td>
<td></td>
</tr>
</tbody>
</table>

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-5
PROGRAM ACTIVITY: OPTIMISTIC ATTITUDES

### Optimistic Attitudes

When something negative happens we can think it's all our fault or that things will never get better. This is having a pessimistic attitude.

If we have an optimistic attitude, then when something negative happens we can think it is not all our own fault, it won't last long and things will get better.

These two attitudes can also work when positive things happen. The person with a pessimistic attitude would say that it was just lucky and does not see that they were responsible for choosing wisely and thinks that it will not last long.

The person with an optimistic attitude however takes credit for what they have done well and knows that they can be successful again soon.

<table>
<thead>
<tr>
<th>Examples</th>
<th>Optimistic Attitude</th>
<th>Pessimistic Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>When something positive happens such as your team winning.</td>
<td>It feels great to be part of a winning team; I contributed to our win.</td>
<td>The other team was really hopeless; I played badly; lucky the rest of my team are good players.</td>
</tr>
<tr>
<td>When something negative happens such as doing badly in an exam.</td>
<td>I didn't really prepare well for the exam; I'll ask the teacher for help; I'll do better in the next topic.</td>
<td>I hate that subject; I will never get better; the work is horrible; I am dumb at schoolwork.</td>
</tr>
<tr>
<td>When something positive happens such as.....</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When something negative happens such as.....</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-6
PROGRAM ACTIVITY: WHAT IS THIS THING CALLED STRESS?

Learning to Cope

1. Three Year 7 students decide to set up a dog washing business at home to earn some money.

2. Their parents agree they can run the business only on the weekends and give them $50 each to help them set it up.

3. The students use the money to buy needed equipment such as dog shampoo, brushes, flea powder, food and bowls. This costs a total of $80.

4. They decide that to wash a large dog will be a charge of $30 and a small dog will cost $20.

5. They spend $30 on advertising pamphlets that they designed on computer and had photocopied at a local printer.

6. The first weekend they spend dropping pamphlets in letterboxes around the local neighbourhood and handing them out at the local shopping centre.

7. The next weekend they get 2 customers. The first is a huge dog that takes 2 of them to hold and bath as his owner warned ‘he does not like having a bath.’ His owner is pleased with the result and pays the $30. The second is a small dog who is easy to handle however, it is a cold day and he catches a cold. The owner is not pleased and refuses to pay.

8. The students are exhausted from their work and realise they need to buy a hair dryer to dry dogs with lots of fur, on cold days. This will cost $50.

9. The next weekend they get 5 customers. There are 2 large dogs – paying $30 each and 3 smaller dogs – paying $20 each. Just before the 2 large dogs are picked up, they get in a huge fight, are filthy as a result and need to be washed again. One of the smaller dogs manages to knock over a bottle of blue dye left in the laundry and after 5 more washes still remains blue. The owner of the new blue dog is furious and not only does not pay but charges $50 to have a professional dog wash parlour dye him back to his proper colour.

10. The next weekend they have 10 customers and things are going smoothly although they are very busy. By lunchtime they have washed and groomed 5 dogs, 3 large and 2 small. One of the students decides they are sick of the dog washing business and quits, taking their $50 startup money with them. Now the 2 remaining students must work much harder to finish working on the other dogs but only manage to wash and groom 1 large and 2 small dogs before the owners arrive.

11. The 2 students sit down to look at the money situation. They have a total of $220 after all the problems have been taken care of. However, they have run out of shampoo and flea powder. This will cost $60 to purchase a supply that should last 3 weekends. They also realise they need an extra person to help.

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-7
PROGRAM ACTIVITY: COPING WITH DIFFICULT SITUATIONS

Coping with Difficult Situations

What is the situation that is causing the stress?

How might we behave if we have a pessimistic attitude?

How might we behave if we have an optimistic attitude?

What strategies can help us to cope with the stress of a difficult situation?

What can we do to help others cope with the stress of a difficult situation?

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-8
PROGRAM ACTIVITY: BOUNCING BACK

Game Board

Cards
**Game Cards**

<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>You forgot to do your homework</td>
<td>You work very hard to get an assignment done on time but you’ve answered the wrong question</td>
<td>You forget your lunch and you have no money</td>
<td>Homework is piling up</td>
</tr>
<tr>
<td>Your parents don’t give you enough freedom</td>
<td>Your first exams are coming up</td>
<td>You forget your train pass</td>
<td>You give up watching your favourite TV show to study for an exam and don’t do as well as you hoped</td>
</tr>
<tr>
<td>You forget your sport uniform</td>
<td>You get into trouble from the teacher</td>
<td>You get an award at school for outstanding effort in class and your friends tease you</td>
<td>You pack the wrong books for school</td>
</tr>
<tr>
<td>You try to sort out an argument with a friend and end up blaming and yelling</td>
<td>You don’t get asked to the party</td>
<td>You get asked to the party but your parents won’t let you go</td>
<td>You had a fight with your friend</td>
</tr>
<tr>
<td>Your parents say yes to a birthday party with your new Year 7 friends but you get sick on the day</td>
<td>Your parents don’t think that you are responsible enough to go out with your friends on your own at the weekend</td>
<td>You are not good friends with anyone in your class</td>
<td>You get lost between classes</td>
</tr>
<tr>
<td>Your parents give you the one gift for your birthday you wanted years ago but not now</td>
<td>No one helps you out by lending you money for lunch</td>
<td>You find out that 3 students you have made friends with in your class do not live near you</td>
<td>You try out for the school tennis team and narrowly miss selection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You are finding a new subject difficult</td>
<td>Your team wins their first game of the season and you were replaced at half time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You forget to bring your permission note for an excursion</td>
</tr>
</tbody>
</table>

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-9
PROGRAM ACTIVITY: HOW TO SOLVE PROBLEMS

Problem Solving Puzzle

1. What is the problem that needs to be solved?

2. What information do I need to know?

3. What are the possible choices?

4. What are the consequences of each of the choices?

5. What is the most positive choice I can make at this time?

6. If the choice is put into practice, do you think it will work?

7. What might we do next time to ensure an even better outcome?

Scenario Card
You forgot to do your homework

Scenario Card
You missed the bus

Peer Support Foundation © 2001, Reproduced with kind permission.
My Goals

Did it!

3rd milestone

2nd milestone

1st milestone

First step

My Goal

Remember this when setting your goals:
- focus on your positive qualities
- practise thinking optimistically
- practise choosing positive behaviours
- have a go and if things don’t work out straight away, try again

Peer Support Foundation © 2001, Reproduced with kind permission.
APPENDIX B-11
PROGRAM ACTIVITY: WHO COULD BE A LIFEBOUY?

Who could be a Lifebuoy?

People who can help me

People I can share my thoughts with

People I can celebrate with

Peer Support Foundation © 2001, Reproduced with kind permission.
# APPENDIX C-1

## DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS IN STUDY 1 ($N = 2335$)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
<th>School 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 7</td>
<td>236 (53.6%)</td>
<td>241 (53.7%)</td>
<td>137 (49.1%)</td>
<td>226 (60.8%)</td>
<td>398 (50.1%)</td>
<td>1238 (53.0%)</td>
</tr>
<tr>
<td>Year 10</td>
<td>204 (46.4%)</td>
<td>208 (46.3%)</td>
<td>142 (50.9%)</td>
<td></td>
<td>397 (49.9%)</td>
<td>951 (40.7%)</td>
</tr>
<tr>
<td>Year 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>146 (6.3%)</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>440 (100%)</td>
<td>449 (100%)</td>
<td></td>
<td>175 (47.0%)</td>
<td>390 (49.1%)</td>
<td>1454 (62.3%)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Country of Birth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>363 (84.6%)</td>
<td>426 (94.9%)</td>
<td>250 (89.6%)</td>
<td>363 (97.6%)</td>
<td>762 (95.8%)</td>
<td>2164 (93.1%)</td>
</tr>
<tr>
<td>Other</td>
<td>66 (15.4%)</td>
<td>23 (5.1%)</td>
<td>29 (10.4%)</td>
<td>9 (2.4%)</td>
<td>33 (4.2%)</td>
<td>160 (6.9%)</td>
</tr>
<tr>
<td>Missing</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td><strong>Language Spoken Most at Home</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>247 (57.4%)</td>
<td>432 (96.4%)</td>
<td>265 (95.0%)</td>
<td>361 (97.0%)</td>
<td>777 (97.7%)</td>
<td>2082 (89.6%)</td>
</tr>
<tr>
<td>Other</td>
<td>183 (42.6%)</td>
<td>16 (3.6%)</td>
<td>14 (5.0%)</td>
<td>11 (3.0%)</td>
<td>18 (2.3%)</td>
<td>242 (10.4%)</td>
</tr>
<tr>
<td>Missing</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

*Note.* Schools 1 and 3 are metropolitan; Schools 2 and 4 are non-metropolitan; School 5 is outer-metropolitan.
## APPENDIX D-1
### SELF DESCRIPTION QUESTIONNAIRE II - SHORT

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>False</th>
<th>Mostly False</th>
<th>More False Than True</th>
<th>More True Than False</th>
<th>Mostly True</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MATHEMATICS is one of my best subjects</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2 I have a nice looking face</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3 Overall, I have a lot to be proud of</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4 I am honest</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5 I enjoy things like sports, gym, and dance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6 I am hopeless in ENGLISH classes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7 I worry more than I need to</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8 I get along well with my parents</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9 I get bad marks in most SCHOOL SUBJECTS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10 I am not very popular with members of the opposite sex</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>it is difficult to make friends with members of my own sex</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12 I get good marks in MATHEMATICS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>13 I am good looking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>14 Most things I do, I do well</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>15 I often tell lies</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>16 I am good at things like sports, gym, and dance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>17 Work in ENGLISH classes is easy for me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>18 I am a nervous person</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>19 My parents treat me fairly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>20 I learn things quickly in most SCHOOL SUBJECTS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>21 I make friends easily with boys</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>22 I make friends easily with girls</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>23 I have always done well in MATHEMATICS</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>24 Other people think I am good looking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>25 Overall, most things I do turn out well</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>26 I sometimes cheat</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>27 I am awkward at things like sports, gym, and dance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>28 ENGLISH is one of my best subjects</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>29 I often feel confused and mixed up</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>30 My parents understand me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>STATEMENT</td>
<td>False</td>
<td>Mostly False</td>
<td>More False Than True</td>
<td>More True Than False</td>
<td>Mostly True</td>
<td>True</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td>--------------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>31 I do well in tests in most <strong>SCHOOL SUBJECTS</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>32 I have lots of friends of the opposite sex</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>33 Not many people of my own sex like me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>34 I do badly in tests in <strong>MATHEMATICS</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>35 I have a good looking body</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>36 I do things as well as most people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>37 I always tell the truth</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>I am better than most of my friends at things like sports, gym, and dance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>39 I get good marks in <strong>ENGLISH</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>40 I get upset easily</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>41 I do not like my parents very much</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>42 I am good at most <strong>SCHOOL SUBJECTS</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>43 I do not get along very well with boys</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>44 I do not get along very well with girls</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>45 If I really try I can do almost anything I want to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>46 I sometimes take things that belong to other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>47 I learn things quickly in <strong>ENGLISH</strong> classes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>48 I worry about a lot of things</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>49 I make friends easily with members of my own sex</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>50 Overall I am a failure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>51 I sometimes tell lies to stay out of trouble</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
## APPENDIX D-2
### REVIEW OF PERSONAL EFFECTIVENESS SCALE

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>FALSE not like me</th>
<th>TRUE like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. When I have spare time I always use it to paint</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>02. I like cooperating in a team</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>03. No matter what the situation is I can handle it</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>04. I can be a good leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>05. My own efforts and actions are what will determine my future</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>06. I prefer to be actively involved in things</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>07. I am open to different thinking if there is a better idea</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>08. In everything I do I try my best to get the details right</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>09. Luck, other people and events control most of my life</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>10. I am confident that I have the ability to succeed in anything I want to do</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>11. I am effective in social situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>12. I am calm in stressful situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>13. My overall effectiveness in life is very high</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>14. I plan and use my time efficiently</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>15. I cope well with changing situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>16. I cooperate well when working in a team</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>17. I prefer things that taste sweet instead of bitter</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>18. No matter what happens I can handle it</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>19. I am capable of being a good leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>20. I like being active and energetic</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>21. What I do and how I do it will determine my successes in life</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>22. I am open to new thoughts and ideas</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>23. I try to get the best possible results when I do things</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>24. When I apply myself to something I am confident I will succeed</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>25. My future is mostly in the hands of other people</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>26. I am competent and effective in social situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>27. I can stay calm and overcome anxiety in almost all situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>28. I am efficient and do not waste time</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>29. Overall, in all things in life, I am effective</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>30. When things around me change I cope well</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>31. I am good at cooperating with team members</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>32. I can handle things no matter what happens</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>33. I solve all mathematics problems easily</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>34. I am seen as a capable leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>35. I like to get into things and make action</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>36. I can adapt my thinking and ideas</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>37. If I succeed in life it will be because of my efforts</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>38. I try to get the very best results in everything I do</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>39. I am confident in my ability to be successful</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>40. I communicate effectively in social situations</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
</tbody>
</table>

407
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. My life is mostly controlled by external things</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. I am calm when things go wrong</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. I am efficient in the way I use my time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. I cope well when things change</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. Overall, in my life I am a very effective person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I have difficulties or problems...</td>
<td>Never</td>
<td>Almost never</td>
<td>Some-times</td>
<td>Fairly Often</td>
<td>Very Often</td>
<td>Always</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------</td>
<td>--------------</td>
<td>------------</td>
<td>-------------</td>
<td>------------</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 I avoid the problem by spending more time alone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 I develop a plan about how to solve the problem before doing anything</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 I go to a friend for advice on how to solve the problem</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 I avoid the problem by watching television more than usual</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 I set goals for myself to deal with the problem</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 I go to a friend to help me feel better</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 I avoid the problem by sleeping more than usual</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 I make a plan of action about what I will do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 I tell my fears and worries to a friend</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 I avoid the problem by pretending that there is no problem</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 I try different ways to solve the problem until I find one that works</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 I ask my friends to support me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 I avoid the problem by staying away from other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 I think about what needs to be done</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 I avoid the problem by wishing that people would leave me alone</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# APPENDIX D-4
## BULLYING ATTITUDE SCALE

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>Completely Disagree</th>
<th>Mostly Disagree</th>
<th>Disagree more than Agree</th>
<th>Agree more than Disagree</th>
<th>Mostly Agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 It's OK to bully others if others are doing it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2 People who are bullied don't deserve it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3 Bullying helps people by making them tougher</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4 Bullying is not OK</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5 Most students who get bullied bring it on themselves</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6 Bullying should be stopped</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7 It's OK to bully others to get even</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8 People who are bullied deserve our help</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9 Bullying is OK if done in fun</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10 There are no good reasons to bully other students</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>11 Other students look up to people who bully others</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>12 People who are bullied suffer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
## APPENDIX D-5
### PARENT AND PEER SUPPORT

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>Completely Disagree</th>
<th>Mostly Disagree</th>
<th>Disagree more than Agree</th>
<th>Agree more than Disagree</th>
<th>Mostly Agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  I can get good support from my parent/s</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2  I can count on help and support, if I need it, from my parent/s</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3  I can get back as much support as I give from my parent/s</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4  I am confident that I am well supported by my parent/s</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5  I can get good support from my peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6  I can count on help and support, if I need it, from my peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7  I can get back as much support as I give from my peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8  I am confident that I am well supported by my peers</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
# APPENDIX D-6
SCHOOL ENJOYMENT SCALE

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>FALSE</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoy being at school</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>2. I like high school</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>3. School is a lot of fun for me</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>4. I'm happy when I am at school</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>5. I look forward to going to school</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX D-7

### YEAR 7 EVALUATION OF THE PROGRAM

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>FALSE</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Evaluation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The activities and topics of the peer program were interesting</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>2. The activity sheets and exercises of the program were excellent</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>3. I found the peer program to be challenging and stimulating</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>4. The peer program was valuable for my personal growth and development</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>5. The peer program was worth the time involved to do it</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>6. Overall, the peer program was of high quality and value</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td><strong>Group Evaluation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. The group discussions were useful and productive</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>8. The group members cooperated with each other</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>9. The group worked well as a team throughout the program</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>10. I could talk openly and easily within the group</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>11. I felt comfortable and accepted within the group</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>12. I made new friendships during the peer program</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td><strong>Leader Evaluation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. My peer leaders gave information and explanations in a clear and</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>understandable way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I could talk openly and easily with my peer leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>15. My peer leader was very friendly to me</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>16. My peer leader set a good example for us to follow</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>17. My peer leader was efficient and organized</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>18. My peer leader was good at managing and controlling the session</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX D-8

### LEADER EVALUATION OF THE PROGRAM

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>FALSE</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Coordination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The peer program was well organised and managed at this school</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>2. The leadership training adequately prepared me for my role as a peer leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>3. The briefing I received was helpful for running the sessions</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>4. The debriefing I received after each session was useful</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>5. The coordinating and/or facilitating teachers provided good support</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>throughout the program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The coordinating and/or facilitating teachers gave me useful feedback</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>on how I was going throughout the program</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Program and Group Evaluation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. The activities and topics of the peer program were interesting to the</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>Year 7's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. The topics of the peer program were relevant to the needs of Year 7</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The students in my group cooperated with each other</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>10. The students in my group worked well as a team throughout the program</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>11. The peer program provided an environment for Year 7 students to</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>establish new friendships</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Value to Self</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Being a peer leader was valuable for my personal growth and</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Being a peer leader was challenging and stimulating</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>14. Being a peer leader has improved my leadership skills</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>15. Being a peer leader has improved my communication skills</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>16. It was worth the time involved to be a peer support leader</td>
<td>1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E-1
SEMI-STRUCTURED INTERVIEW GUIDE

The following questions were used as a guide to interview participants. The interview process was semi-structured to allow the interviewer to pursue relevant topics in more detail and probe as necessary to enrich descriptions of particular events and experiences shared by participants. Texts in parentheses are alternative phrases to encourage discussion.

Q1: What was good about the peer support program?  
   (What did you like about the program?)

Q2: What was not good about the peer support program?  
   (What didn’t you like about the program?) (How could the program be improved in the future?)

Q3: What value did you get out of it personally?  
   (How was the program helpful to you?) (In what ways was the program of benefit to you?)

Examples of probing questions:

“What did you mean when you said...”
“You said...Tell me more about that.”
### APPENDIX F-1

**RAW SCORE MEANS FOR YEAR 7 EXPERIMENTAL AND CONTROL GROUPS AT TIME 1, TIME 2 AND TIME 3 (N = 930)**

<table>
<thead>
<tr>
<th>SDQ II-S</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>M 4.88</td>
<td>4.87</td>
</tr>
<tr>
<td></td>
<td>SD 1.09</td>
<td>1.08</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>M 4.42</td>
<td>4.22</td>
</tr>
<tr>
<td></td>
<td>SD 1.22</td>
<td>1.25</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>M 5.21</td>
<td>5.20</td>
</tr>
<tr>
<td></td>
<td>SD 0.93</td>
<td>0.92</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>M 4.49</td>
<td>4.63</td>
</tr>
<tr>
<td></td>
<td>SD 1.26</td>
<td>1.25</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>M 4.72</td>
<td>4.75</td>
</tr>
<tr>
<td></td>
<td>SD 0.95</td>
<td>0.98</td>
</tr>
<tr>
<td>Parent Relationships</td>
<td>M 5.51</td>
<td>5.40</td>
</tr>
<tr>
<td></td>
<td>SD 0.73</td>
<td>0.87</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>M 3.92</td>
<td>4.03</td>
</tr>
<tr>
<td></td>
<td>SD 1.26</td>
<td>1.28</td>
</tr>
<tr>
<td>Verbal</td>
<td>M 4.24</td>
<td>4.39</td>
</tr>
<tr>
<td></td>
<td>SD 1.29</td>
<td>1.31</td>
</tr>
<tr>
<td>Math</td>
<td>M 4.33</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td>SD 1.35</td>
<td>1.44</td>
</tr>
<tr>
<td>General School</td>
<td>M 4.77</td>
<td>4.80</td>
</tr>
<tr>
<td></td>
<td>SD 1.04</td>
<td>1.05</td>
</tr>
<tr>
<td>Global Self-Esteem</td>
<td>M 5.21</td>
<td>5.13</td>
</tr>
<tr>
<td></td>
<td>SD 0.77</td>
<td>0.84</td>
</tr>
</tbody>
</table>

**ROPE**

<table>
<thead>
<tr>
<th></th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>M 7.02</td>
<td>6.81</td>
</tr>
<tr>
<td></td>
<td>SD 1.15</td>
<td>1.31</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>M 6.14</td>
<td>5.81</td>
</tr>
<tr>
<td></td>
<td>SD 1.42</td>
<td>1.70</td>
</tr>
<tr>
<td>Stress Management</td>
<td>M 5.86</td>
<td>5.76</td>
</tr>
<tr>
<td></td>
<td>SD 1.53</td>
<td>1.69</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>M 6.72</td>
<td>6.72</td>
</tr>
<tr>
<td></td>
<td>SD 1.21</td>
<td>1.29</td>
</tr>
</tbody>
</table>

*Note.* Means for participants who did not complete Time 1 measures are not included in the table.
<table>
<thead>
<tr>
<th></th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
</tr>
<tr>
<td>Social Efficacy</td>
<td>M 6.51</td>
<td>6.44</td>
</tr>
<tr>
<td></td>
<td>SD 1.33</td>
<td>1.43</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td>M 7.06</td>
<td>6.80</td>
</tr>
<tr>
<td></td>
<td>SD 1.24</td>
<td>1.42</td>
</tr>
<tr>
<td>Leadership Ability</td>
<td>M 6.55</td>
<td>6.55</td>
</tr>
<tr>
<td></td>
<td>SD 1.55</td>
<td>1.54</td>
</tr>
<tr>
<td>Time Efficacy</td>
<td>M 6.30</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>SD 1.46</td>
<td>1.62</td>
</tr>
<tr>
<td>Quality Seeking</td>
<td>M 7.24</td>
<td>6.98</td>
</tr>
<tr>
<td></td>
<td>SD 0.97</td>
<td>1.18</td>
</tr>
<tr>
<td>Coping with Change</td>
<td>M 6.34</td>
<td>6.21</td>
</tr>
<tr>
<td></td>
<td>SD 1.52</td>
<td>1.61</td>
</tr>
<tr>
<td>Active Involvement</td>
<td>M 6.98</td>
<td>6.82</td>
</tr>
<tr>
<td></td>
<td>SD 1.23</td>
<td>1.31</td>
</tr>
<tr>
<td></td>
<td>SD 1.23</td>
<td>1.50</td>
</tr>
<tr>
<td>CSI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>M 4.22</td>
<td>4.25</td>
</tr>
<tr>
<td></td>
<td>SD 1.12</td>
<td>1.14</td>
</tr>
<tr>
<td>Seeks Social Support</td>
<td>M 4.04</td>
<td>4.13</td>
</tr>
<tr>
<td></td>
<td>SD 1.45</td>
<td>1.40</td>
</tr>
<tr>
<td>Avoidance</td>
<td>M 2.74</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>SD 1.13</td>
<td>1.16</td>
</tr>
<tr>
<td>APRI-A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully</td>
<td>M 2.29</td>
<td>2.32</td>
</tr>
<tr>
<td></td>
<td>SD 1.01</td>
<td>1.05</td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>M 4.90</td>
<td>4.84</td>
</tr>
<tr>
<td></td>
<td>SD 1.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Support Scales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent Support</td>
<td>M 5.64</td>
<td>5.57</td>
</tr>
<tr>
<td></td>
<td>SD 0.67</td>
<td>0.78</td>
</tr>
<tr>
<td>Peer Support</td>
<td>M 5.02</td>
<td>4.91</td>
</tr>
<tr>
<td></td>
<td>SD 1.01</td>
<td>1.12</td>
</tr>
<tr>
<td>School Enjoyment Scale</td>
<td>M 6.17</td>
<td>5.83</td>
</tr>
<tr>
<td></td>
<td>SD 1.52</td>
<td>1.85</td>
</tr>
</tbody>
</table>

_Note._ Means for participants who did not complete Time 1 measures are not included in the table.
APPENDIX 7-2
MULTILEVEL MODELLING RESULTS FOR GRADE 7 STUDENTS

In Study 2, 3 key models were used to compare the scale scores of students in the experimental group with those in the control group. Model 1a is the baseline variance components model, which indicates how much of the total variance was partitioned into variance components associated with school, individual and time. Model 1b indicates how much of the variance in school and individual student scores could be explained in terms of the T1 variable. Model 2 includes the addition of three variables, Time, Group, and the Group x Time interaction. Model 3 includes the addition of three new interaction terms to test for the presence of aptitude-treatment interaction effects. In each of the models: $XB$ = fixed part of the model; $\Omega$ = covariance matrix; $\beta_{0ijk}$ = intercept; $\nu_{0k}$ = random school effect; $u_{0jk}$ = random student effect; and $\epsilon_{ijk}$ = random time effect.

SDQII-S
Physical Ability: Model 1a

\[ \text{phyabl}_{ij} \sim N(XB, \Omega) \]
\[ \text{phyabl}_{ij} = \beta_{0ijk} + \nu_{0k} + \epsilon_{2jk} \]

\[ \begin{bmatrix} \nu_{0k} \\ \epsilon_{2jk} \end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.000(0.000) \\ 0.750(0.044) \end{bmatrix} \]

\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.276(0.015) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3967.135(1567 of 1860 cases in use)\]

Physical Ability: Model 1b

\[ \text{phyabl}_{ij} \sim N(XB, \Omega) \]
\[ \text{phyabl}_{ij} = \beta_{0ijk} + \beta_{1ijk}\text{cons} + \nu_{0k} + \epsilon_{2jk} \]
\[ \beta_{0ijk} = -0.055(0.024) + \nu_{0k} + u_{0jk} + \epsilon_{2jk} \]

\[ \begin{bmatrix} \nu_{0k} \\ \epsilon_{2jk} \end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.000(0.000) \\ 0.505(0.025) \end{bmatrix} \]

\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.255(0.016) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3158.130(1450 of 1860 cases in use)\]
Physical Ability: Model 2

\[ \text{phyabl}_{ij} \sim N(X_i \beta, \Omega) \]

\[ \beta_{y_{ij}} = \beta_{y_{ij}} \text{cons} + 0.665(0.024) \times \text{phyabl}_{ij} + -0.014(0.014) \times \text{time}_{ij} + 0.032(0.024) \times \text{group}_{ij} + 0.028(0.015) \times \text{time}_{ij} \times \text{group}_{ij} \]

\[ \beta_{y_{ij}} = -0.053(0.024) + v_{ij} + u_{ij} + e_{ij} \]

\[ \begin{bmatrix} v_{ij} \\ u_{ij} \\ e_{ij} \end{bmatrix} \sim N(\Omega, \Omega_\phi) \]

\[ \Omega_\phi = \begin{bmatrix} 0.000(0.000) \\ 0.000(0.000) \\ 0.000(0.000) \end{bmatrix} \]

\[ \Omega_\phi = \begin{bmatrix} 0.305(0.025) \\ 0.305(0.025) \\ 0.285(0.016) \end{bmatrix} \]

\[ -2 \times \text{log likelihood(GLS Deviance)} = 3151.428 (1450 of 1860 cases in use) \]

Physical Ability: Model 3

\[ \text{phyabl}_{ij} \sim N(X_i \beta, \Omega) \]

\[ \beta_{y_{ij}} = \beta_{y_{ij}} \text{cons} + 0.665(0.024) \times \text{phyabl}_{ij} + -0.013(0.014) \times \text{time}_{ij} + 0.031(0.024) \times \text{group}_{ij} + 0.028(0.015) \times \text{group}_{ij} \times \text{time}_{ij} \]

\[ \beta_{y_{ij}} = -0.055(0.024) + v_{ij} + u_{ij} + e_{ij} \]

\[ \begin{bmatrix} v_{ij} \\ u_{ij} \\ e_{ij} \end{bmatrix} \sim N(\Omega, \Omega_\phi) \]

\[ \Omega_\phi = \begin{bmatrix} 0.000(0.000) \\ 0.000(0.000) \\ 0.000(0.000) \end{bmatrix} \]

\[ \Omega_\phi = \begin{bmatrix} 0.306(0.025) \\ 0.306(0.025) \\ 0.282(0.016) \end{bmatrix} \]

\[ -2 \times \text{log likelihood(GLS Deviance)} = 3145.553 (1450 of 1860 cases in use) \]

Physical Appearance: Model 1a

\[ \text{appear}_{ij} \sim N(X_i \beta, \Omega) \]

\[ \beta_{y_{ij}} = \beta_{y_{ij}} \text{cons} \]

\[ \beta_{y_{ij}} = 0.042(0.127) \times v_{ij} + u_{ij} + e_{ij} \]

\[ \begin{bmatrix} v_{ij} \\ u_{ij} \\ e_{ij} \end{bmatrix} \sim N(\Omega, \Omega_\phi) \]

\[ \Omega_\phi = \begin{bmatrix} 0.048(0.039) \\ 0.479(0.042) \\ 0.284(0.015) \end{bmatrix} \]

\[ -2 \times \text{log likelihood(GLS Deviance)} = 3982.896 (1561 of 1860 cases in use) \]
Physical Appearance: Model 1b

\[
\text{appear}_{gc} \sim N(\beta \text{cons} + \beta \text{time} + \beta \text{group}, \sigma)
\]

\[
\begin{align*}
\beta_{\text{cons}} &= 0.055(0.057) + v_{\text{cons}} + u_{\text{cons}} + e_{\text{cons}} \\
\beta_{\text{time}} &= 0.059(0.043) + v_{\text{time}} + u_{\text{time}} + e_{\text{time}} \\
\beta_{\text{group}} &= 0.037(0.027) + v_{\text{group}} + u_{\text{group}} + e_{\text{group}} \\
\end{align*}
\]

\[
\begin{bmatrix}
v_{\text{cons}} \\
v_{\text{time}} \\
v_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.008(0.008) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{cons}} \\
u_{\text{time}} \\
u_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.408(0.030) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{cons}} \\
e_{\text{time}} \\
e_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.287(0.016) \end{bmatrix}
\]

\[-2 \times \text{loglikelhood(IAGLS Deviance)} = 3306.223\text{ (1443 of 1860 cases in use)}\]

Physical Appearance: Model 2

\[
\text{appear}_{gc} \sim N(\beta \text{cons} + \beta \text{time} + \beta \text{group}, \sigma)
\]

\[
\begin{align*}
\beta_{\text{cons}} &= 0.058(0.058) + v_{\text{cons}} + u_{\text{cons}} + e_{\text{cons}} \\
\beta_{\text{time}} &= 0.018(0.015) + v_{\text{time}} + u_{\text{time}} + e_{\text{time}} \\
\beta_{\text{group}} &= 0.013(0.011) + v_{\text{group}} + u_{\text{group}} + e_{\text{group}} \\
\end{align*}
\]

\[
\begin{bmatrix}
v_{\text{cons}} \\
v_{\text{time}} \\
v_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.008(0.008) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{cons}} \\
u_{\text{time}} \\
u_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.411(0.020) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{cons}} \\
e_{\text{time}} \\
e_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.288(0.016) \end{bmatrix}
\]

\[-2 \times \text{loglikelhood(IAGLS Deviance)} = 3286.250\text{ (1443 of 1860 cases in use)}\]

Physical Appearance: Model 3

\[
\text{appear}_{gc} \sim N(\beta \text{cons} + \beta \text{time} + \beta \text{group}, \sigma)
\]

\[
\begin{align*}
\beta_{\text{cons}} &= 0.066(0.066) + v_{\text{cons}} + u_{\text{cons}} + e_{\text{cons}} \\
\beta_{\text{time}} &= 0.061(0.014) + v_{\text{time}} + u_{\text{time}} + e_{\text{time}} \\
\beta_{\text{group}} &= 0.034(0.027) + v_{\text{group}} + u_{\text{group}} + e_{\text{group}} \\
\end{align*}
\]

\[
\begin{bmatrix}
v_{\text{cons}} \\
v_{\text{time}} \\
v_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.009(0.009) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{cons}} \\
u_{\text{time}} \\
u_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.416(0.030) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{cons}} \\
e_{\text{time}} \\
e_{\text{group}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.282(0.016) \end{bmatrix}
\]

\[-2 \times \text{loglikelhood(IAGLS Deviance)} = 3264.880\text{ (1443 of 1860 cases in use)}\]

420
Same-Sex Relations: Model 1a
\[
\text{smex}_{x_k} \sim N(X \beta, \Omega)
\]
\[
\text{smex}_{x_k} = \beta_{0x_k} + \text{cons} + \beta_{1x_k} \text{smex}_{x_k} + u_{q_k} + e_{q_k}
\]
\[
\begin{bmatrix}
Y_{qk} \\
u_{qk} \\
u_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.000(0.000) \\
0.588(0.041) \\
0.401(0.022)
\end{bmatrix}
\]

\[-2* \text{loglikelihood (IGLS Deviance)} = 4131.829(1567 of 1860 cases in use)\]

Same-Sex Relations: Model 1b
\[
\text{smex}_{x_k} \sim N(X \beta, \Omega)
\]
\[
\text{smex}_{x_k} = \beta_{0x_k} \text{cons} + u_{qk} + e_{qk}
\]
\[
\begin{bmatrix}
Y_{qk} \\
u_{qk} \\
u_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.003(0.004) \\
0.379(0.033) \\
0.401(0.022)
\end{bmatrix}
\]

\[-2* \text{loglikelihood (IGLS Deviance)} = 3581.563(1448 of 1860 cases in use)\]

Same-Sex Relations: Model 2
\[
\text{smex}_{x_k} \sim N(X \beta, \Omega)
\]
\[
\text{smex}_{x_k} = \beta_{0x_k} \text{cons} + u_{qk} + e_{qk}
\]
\[
\begin{bmatrix}
Y_{qk} \\
u_{qk} \\
u_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.003(0.004) \\
0.380(0.033) \\
0.398(0.022)
\end{bmatrix}
\]

\[-2* \text{loglikelihood (IGLS Deviance)} = 3575.391(1448 of 1860 cases in use)\]
Same-Sex Relations: Model 3

\[
\text{sмесx}_{ge} \sim N(XB, \Omega)
\]

\[
\begin{align*}
\text{sмесx}_{ge} &= \beta_{0ge}\text{cons} + 0.435(0.028)\text{sмесx}_{jk} + -0.040(0.017)\text{time}_{jk} + -0.003(0.028)\text{group}_{jk} + \\
&\quad 0.015(0.017)\text{group}.\text{time}_{jk} + -0.032(0.017)\text{time}_{jk}\text{sмесx}.\text{time}_{jk} + -0.017(0.027)\text{time}_{jk}\text{sмесx}.\text{group}_{jk} + \\
&\quad 0.025(0.017)\text{time}_{jk}\text{sмесx}.\text{group}.\text{time}_{jk}
\end{align*}
\]

\[
\beta_{0ge} = -0.001(0.040) + \nu_{0g} + \mu_{0k} + \epsilon_{0ge}
\]

\[
\begin{align*}
\nu_{0g} &\sim N(0, \Omega_v) : \Omega_v = [0.003(0.004)] \\
\mu_{0k} &\sim N(0, \Omega_u) : \Omega_u = [0.383(0.033)] \\
\epsilon_{0ge} &\sim N(0, \Omega_e) : \Omega_e = [0.394(0.022)]
\end{align*}
\]

\[-2*\text{loglikelihood}\text{-IGLS Deviance} = 3568.768\text{ (1448 of 1860 cases in use)}\]

Opposite-Sex Relations: Model 1a

\[
\text{oppsx}_{ge} \sim N(XB, \Omega)
\]

\[
\begin{align*}
\text{oppsx}_{ge} &= \beta_{0ge}\text{cons} + 0.089(0.057)\text{oppsx}_{jk} + \nu_{0g} + \mu_{0k} + \epsilon_{0ge}
\end{align*}
\]

\[
\begin{align*}
\nu_{0g} &\sim N(0, \Omega_v) : \Omega_v = [0.007(0.008)] \\
\mu_{0k} &\sim N(0, \Omega_u) : \Omega_u = [0.645(0.039)] \\
\epsilon_{0ge} &\sim N(0, \Omega_e) : \Omega_e = [0.527(0.015)]
\end{align*}
\]

\[-2*\text{loglikelihood}\text{-IGLS Deviance} = 3848.451\text{ (1566 of 1860 cases in use)}\]

Opposite-Sex Relations: Model 1b

\[
\text{oppsx}_{ge} \sim N(XB, \Omega)
\]

\[
\begin{align*}
\text{oppsx}_{ge} &= \beta_{0ge}\text{cons} + 0.600(0.024)\text{oppsx}_{jk} + 0.066(0.024)\text{oppsx}_{jk} + \nu_{0g} + \mu_{0k} + \epsilon_{0ge}
\end{align*}
\]

\[
\begin{align*}
\nu_{0g} &\sim N(0, \Omega_v) : \Omega_v = [0.600(0.000)] \\
\mu_{0k} &\sim N(0, \Omega_u) : \Omega_u = [0.304(0.025)] \\
\epsilon_{0ge} &\sim N(0, \Omega_e) : \Omega_e = [0.527(0.015)]
\end{align*}
\]

\[-2*\text{loglikelihood}\text{-IGLS Deviance} = 3124.452\text{ (1447 of 1860 cases in use)}\]
Opposite-Sex Relations: Model 2
\[
\text{oppsx}_{it} \sim \mathcal{N}(X_{it} \Omega)
\]
\[
\text{oppsx}_{it} = \beta_{y1} \text{cons} + 0.600(0.024) \text{time}_{it} + 0.018(0.014) \text{group}_{i} + 0.072(0.024) \text{time}_{it} \text{group}_{i} + 0.099(0.014) \text{time}_{it} \text{group}_{i}
\]
\[
\beta_{y1} = 0.075(0.024) + \nu_{y1} + \eta_{y1} + \epsilon_{y1}
\]
\[
[\nu_{y1}] \sim \mathcal{N}(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]
\[
[\eta_{y1}] \sim \mathcal{N}(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.300(0.025) \end{bmatrix}
\]
\[
[\epsilon_{y1}] \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.278(0.015) \end{bmatrix}
\]
\[-2\text{loglikelihood/(GLS Deviance)} = 3114.036\text{ of 1447 cases in use}\]

Opposite-Sex Relations: Model 3
\[
\text{oppsx}_{it} \sim \mathcal{N}(X_{it} \Omega)
\]
\[
\text{oppsx}_{it} = \beta_{y2} \text{cons} + 0.599(0.024) \text{time}_{it} + 0.017(0.014) \text{group}_{i} + 0.058(0.014) \text{time}_{it} \text{group}_{i} + 0.057(0.024) \text{time}_{it} \text{group}_{i} + 0.003(0.014) \text{time}_{it} \text{group}_{i}
\]
\[
\beta_{y2} = 0.076(0.024) + \nu_{y2} + \eta_{y2} + \epsilon_{y2}
\]
\[
[\nu_{y2}] \sim \mathcal{N}(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]
\[
[\eta_{y2}] \sim \mathcal{N}(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.301(0.024) \end{bmatrix}
\]
\[
[\epsilon_{y2}] \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.278(0.015) \end{bmatrix}
\]
\[-2\text{loglikelihood/(GLS Deviance)} = 3092.303\text{ of 1447 cases in use}\]

Honesty/Trustworthiness: Model 1a
\[
\text{honest}_{it} \sim \mathcal{N}(X_{it} \Omega)
\]
\[
\text{honest}_{it} = \beta_{y3} \text{cons}
\]
\[
\beta_{y3} = -0.058(0.061) + \nu_{y3} + \eta_{y3} + \epsilon_{y3}
\]
\[
[\nu_{y3}] \sim \mathcal{N}(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.007(0.009) \end{bmatrix}
\]
\[
[\eta_{y3}] \sim \mathcal{N}(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.568(0.052) \end{bmatrix}
\]
\[
[\epsilon_{y3}] \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.532(0.015) \end{bmatrix}
\]
\[-2\text{loglikelihood/(GLS Deviance)} = 4229.826\text{ of 1567 cases in use}\]
Honesty/Trustworthiness: Model 1b
\[ \text{honest}_{jk} \sim N(\mu, \Sigma) \]
\[ \text{honest}_{jk} = \beta_{0jk}\text{cons} + 0.613(0.029)\times \text{time}_{jk} + 0.060(0.029)\text{group}_{jk} + \]  
\[ -0.022(0.016)\text{time}_{jk} \times \text{group}_{jk} \]
\[ \beta_{0jk} = -0.036(0.057) + v_{0k} + u_{0k} + e_{0jk} \]
\[ [v_{0k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.007(0.008) \end{bmatrix} \]
\[ [u_{0k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.500(0.036) \end{bmatrix} \]
\[ [e_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.325(0.018) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 3548.457(1450 of 1860 cases in use)\]

Honesty/Trustworthiness: Model 2
\[ \text{honest}_{jk} \sim N(\mu, \Sigma) \]
\[ \text{honest}_{jk} = \beta_{0jk}\text{cons} + 0.613(0.029)\times \text{time}_{jk} + 0.060(0.029)\text{group}_{jk} + \]  
\[ -0.022(0.016)\text{time}_{jk} \times \text{group}_{jk} \]
\[ \beta_{0jk} = -0.035(0.056) + v_{0k} + u_{0k} + e_{0jk} \]
\[ [v_{0k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.007(0.008) \end{bmatrix} \]
\[ [u_{0k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.497(0.036) \end{bmatrix} \]
\[ [e_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.324(0.018) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 3542.223(1450 of 1860 cases in use)\]

Honesty/Trustworthiness: Model 3
\[ \text{honest}_{jk} \sim N(\mu, \Sigma) \]
\[ \text{honest}_{jk} = \beta_{0jk}\text{cons} + 0.614(0.029)\times \text{time}_{jk} + 0.060(0.029)\text{group}_{jk} + \]  
\[ -0.021(0.016)\text{time}_{jk} \times \text{group}_{jk} + 0.021(0.016)\text{time}_{jk} \times \text{honest}_{jk} \]  
\[ + 0.010(0.016)\text{honest}_{jk} \times \text{time}_{jk} + 0.011(0.029)\text{honest}_{jk} \times \text{group}_{jk} + \]  
\[ 0.029(0.016)\text{time}_{jk} \times \text{honest}_{jk} \times \text{group}_{jk} \]
\[ \beta_{0jk} = -0.035(0.057) + v_{0k} + u_{0k} + e_{0jk} \]
\[ [v_{0k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.007(0.008) \end{bmatrix} \]
\[ [u_{0k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.496(0.036) \end{bmatrix} \]
\[ [e_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.323(0.018) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 3538.901(1450 of 1860 cases in use)\]
Parent Relations: Model 1a

\[ \text{parent}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{parent}_{pk} = \beta_{b_{pk}} \text{cons} \]

\[ \beta_{b_{pk}} = -0.143 (0.144) + v_{b_{pk}} + u_{b_{pk}} + \epsilon_{b_{pk}} \]

\[ [v_{b_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.058 (0.051) \end{bmatrix} \]

\[ [u_{b_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.973 (0.062) \end{bmatrix} \]

\[ [\epsilon_{b_{pk}}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.487 (0.026) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 4647.551 (1567 of 1860 cases in use)\]

Parent Relations: Model 1b

\[ \text{parent}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{parent}_{pk} = \beta_{b_{pk}} \text{cons} + 0.587 (0.034) t1 \text{parent}_{pk} \]

\[ \beta_{b_{pk}} = -0.133 (0.110) + v_{b_{pk}} + u_{b_{pk}} + \epsilon_{b_{pk}} \]

\[ [v_{b_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.033 (0.029) \end{bmatrix} \]

\[ [u_{b_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.616 (0.048) \end{bmatrix} \]

\[ [\epsilon_{b_{pk}}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.501 (0.023) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 4045.907 (1448 of 1860 cases in use)\]

Parent Relations: Model 2

\[ \text{parent}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{parent}_{pk} = \beta_{b_{pk}} \text{cons} - 0.587 (0.034) t1 \text{parent}_{pk} - 0.049 (0.019) \text{time}_{pk} + 0.006 (0.034) \text{group}_{pk} - 0.011 (0.019) \text{group}_{pk} \times \text{time}_{pk} \]

\[ \beta_{b_{pk}} = -0.136 (0.110) + v_{b_{pk}} + u_{b_{pk}} + \epsilon_{b_{pk}} \]

\[ [v_{b_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.033 (0.029) \end{bmatrix} \]

\[ [u_{b_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.616 (0.048) \end{bmatrix} \]

\[ [\epsilon_{b_{pk}}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.496 (0.025) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 4039.040 (1448 of 1860 cases in use)\]
Parent Relations: Model 3

\[
\text{parent}_{ik} \sim \mathcal{N}(X_{ik}, \Omega)
\]

\[
\begin{align*}
\text{parent}_{ik} &= \beta_{0ik} + \text{cons} + 0.583(0.034)\text{time}_{ik} + 0.050(0.019)\text{time}_{ik}^2 + 0.005(0.034)\text{group}_{ik} + \\
&+ 0.011(0.019)\text{group}_{ik}^2 - 0.001(0.019)\text{parent}\cdot\text{time}_{ik}^2 - 0.068(0.034)\text{parent}\cdot\text{group}_{ik} + \\
&+ 0.013(0.019)\text{parent}\cdot\text{group}_{ik}^2
\end{align*}
\]

\[
\beta_{0ik} = -0.131(0.105) + \gamma_{ik} + u_{0ik} + \epsilon_{0ik}
\]

\[
\begin{align*}
[v_{ik}] &\sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.030(0.027) \end{bmatrix} \\
[u_{0ik}] &\sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.612(0.047) \end{bmatrix} \\
[e_{0ik}] &\sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.495(0.023) \end{bmatrix}
\end{align*}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 4031.584(1448 of 1860 cases in use)\]

Emotional Stability: Model 1a

\[
\text{emstb}_{ik} \sim \mathcal{N}(X_{ik}, \Omega)
\]

\[
\text{emstb}_{ik} = \beta_{0ik} + \text{cons}
\]

\[
\beta_{0ik} = 0.120(0.052) + v_{ik} + u_{0ik} + \epsilon_{0ik}
\]

\[
\begin{align*}
[v_{ik}] &\sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
[u_{0ik}] &\sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.728(0.044) \end{bmatrix} \\
[e_{0ik}] &\sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.310(0.017) \end{bmatrix}
\end{align*}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 4043.105(1567 of 1860 cases in use)\]

Emotional Stability: Model 1b

\[
\text{emstb}_{ik} \sim \mathcal{N}(X_{ik}, \Omega)
\]

\[
\text{emstb}_{ik} = \beta_{0ik} + \text{cons} - 0.5(0.013)\text{emstb}_{ik}\cdot\text{time}_{ik} + 0.157(0.044)\text{emstb}_{ik} + v_{ik} + u_{0ik} + \epsilon_{0ik}
\]

\[
\begin{align*}
[v_{ik}] &\sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.004(0.005) \end{bmatrix} \\
[u_{0ik}] &\sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.391(0.050) \end{bmatrix} \\
[e_{0ik}] &\sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.310(0.017) \end{bmatrix}
\end{align*}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3360.330(1448 of 1860 cases in use)\]

426
**Emotional Stability: Model 2**

\[ \text{emtsb}_{jk} \sim N(X_{jk}, \Omega) \]

\[ \text{emtsb}_{jk} = \beta_0 \text{cons} + 0.579(0.027)\text{time}_{jk} + -0.002(0.015)\text{time}_{jk} + 0.005(0.027)\text{group}_{jk} + 0.029(0.015)\text{time}_{jk} \]

\[ \beta_{1jk} = 0.139(0.043) + \nu_{1jk} + \mu_{1jk} + \epsilon_{1jk} \]

\[ [\nu_{1jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.003(0.004) \end{bmatrix} \]

\[ [\mu_{1jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.394(0.030) \end{bmatrix} \]

\[ [\epsilon_{1jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.306(0.017) \end{bmatrix} \]

\[-2*\text{loglikelihood(GLS Deviance)} = 3353.642(1448 of 1860 cases in use)\]

**Emotional Stability: Model 3**

\[ \text{emtsb}_{jk} \sim N(X_{jk}, \Omega) \]

\[ \text{emtsb}_{jk} = \beta_0 \text{cons} + 0.581(0.027)\text{time}_{jk} + -0.002(0.015)\text{time}_{jk} + 0.006(0.027)\text{group}_{jk} + 0.029(0.015)\text{time}_{jk} \]

\[ \beta_{1jk} = 0.139(0.042) + \nu_{1jk} + \mu_{1jk} + \epsilon_{1jk} \]

\[ [\nu_{1jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.003(0.004) \end{bmatrix} \]

\[ [\mu_{1jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.391(0.030) \end{bmatrix} \]

\[ [\epsilon_{1jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.306(0.017) \end{bmatrix} \]

\[-2*\text{loglikelihood(GLS Deviance)} = 3349.939(1448 of 1860 cases in use)\]

**Verbal: Model 1a**

\[ \text{verbal}_{jk} \sim N(X_{jk}, \Omega) \]

\[ \text{verbal}_{jk} = \beta_0 \text{cons} \]

\[ \beta_0 = 0.085(0.166) + \nu_{0jk} + \mu_{0jk} + \epsilon_{0jk} \]

\[ [\nu_{0jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.08(0.068) \end{bmatrix} \]

\[ [\mu_{0jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.10(0.041) \end{bmatrix} \]

\[ [\epsilon_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.244(0.013) \end{bmatrix} \]

\[-2*\text{loglikelihood(GLS Deviance)} = 3333.676(1567 of 1860 cases in use)\]
**Verbal: Model 1b**

\[ \text{verbal}_{jk} \sim N(\beta \text{cons} + 0.584(0.027)t1 \text{verbal}_{jk}) \]

\[ \beta_{jk} = 0.068(0.096) + v_{jk} + u_{jk} + e_{jk} \]

\[ \begin{bmatrix} v_{jk} \\ u_{jk} \\ e_{jk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.025(0.022) \\ 0.401(0.028) \\ 0.234(0.013) \end{bmatrix} \]

\[-2 \text{loglikelihood(IGLS Deviance)} = 3136.322(1448 of 1860 cases in use)\]

**Verbal: Model 2**

\[ \text{verbal}_{jk} \sim N(\beta \text{cons} + 0.584(0.027)t1 \text{verbal}_{jk} + 0.012(0.013) \text{time}_{jk} + 0.079(0.026) \text{group}_{jk} + -0.006(0.013) \text{group} \cdot \text{time}_{jk}) \]

\[ \beta_{jk} = 0.068(0.095) + v_{jk} + u_{jk} + e_{jk} \]

\[ \begin{bmatrix} v_{jk} \\ u_{jk} \\ e_{jk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.025(0.022) \\ 0.395(0.027) \\ 0.234(0.013) \end{bmatrix} \]

\[-2 \text{loglikelihood(IGLS Deviance)} = 3126.066(1448 of 1860 cases in use)\]

**Verbal: Model 3**

\[ \text{verbal}_{jk} \sim N(\beta \text{cons} + 0.581(0.027)t1 \text{verbal}_{jk} + 0.013(0.013) \text{time}_{jk} + 0.080(0.026) \text{group}_{jk} + -0.006(0.013) \text{group} \cdot \text{time}_{jk}) \]

\[ \beta_{jk} = 0.068(0.093) + v_{jk} + u_{jk} + e_{jk} \]

\[ \begin{bmatrix} v_{jk} \\ u_{jk} \\ e_{jk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.025(0.021) \\ 0.395(0.027) \\ 0.234(0.013) \end{bmatrix} \]

\[-2 \text{loglikelihood(IGLS Deviance)} = 3122.987(1448 of 1860 cases in use)\]
Math: Model 1a

\[ \text{math}_{2k} \sim N(\alpha, \Omega) \]
\[ \text{math}_{2k} = \beta_{2k1} + \gamma_{2k} + u_{2k} + e_{2k} \]
\[ [v_{2k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.023(0.022) \end{bmatrix} \]
\[ [u_{2k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.911(0.050) \end{bmatrix} \]
\[ [e_{2k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.217(0.012) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3912.939(1563 \text{ of 1860 cases in use})\]

Math: Model 1b

\[ \text{math}_{2k} \sim N(\alpha, \Omega) \]
\[ \text{math}_{2k} = \beta_{2k1} + 0.717(0.025) \gamma_{2k1} + u_{2k} + e_{2k} \]
\[ [v_{2k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.013(0.012) \end{bmatrix} \]
\[ [u_{2k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.394(0.027) \end{bmatrix} \]
\[ [e_{2k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.216(0.012) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3053.838(1447 \text{ of 1860 cases in use})\]

Math: Model 2

\[ \text{math}_{2k} \sim N(\alpha, \Omega) \]
\[ \text{math}_{2k} = \beta_{2k1} + 0.717(0.025) \gamma_{2k1} - 0.028(0.013) \gamma_{2k} + 0.012(0.025) \text{group}_{2k} + 0.061(0.013) \text{time}_{2k} + \gamma_{2k} + u_{2k} + e_{2k} \]
\[ [v_{2k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.013(0.012) \end{bmatrix} \]
\[ [u_{2k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.394(0.027) \end{bmatrix} \]
\[ [e_{2k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.216(0.012) \end{bmatrix} \]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3048.690(1447 \text{ of 1860 cases in use})\]
Math: Model 3

\[ \text{math}_{gh} \sim N(X_{gh}, \Omega) \]

\[ \text{math}_{gh} = \beta_{gh}\text{cons} - 0.715(0.025) \times \text{math}_{gh} + -0.025(0.013) \times \text{time}_{gh} + -0.016(0.013) \times \text{group}_{gh} + \\
0.001(0.013) \times \text{group}_{gh} - 0.016(0.013) \times \text{math} \times \text{time}_{gh} - 0.006(0.025) \times \text{group}_{gh} + \\
-0.016(0.013) \times \text{math} \times \text{group} \times \text{time}_{gh} \]

\[ \beta_{gh} = -0.057(0.070) + v_{gh} + u_{gh} + e_{gh} \]

\[ [v_{gh}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.013(0.012) \end{bmatrix} \]

\[ [u_{gh}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.394(0.027) \end{bmatrix} \]

\[ [e_{gh}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.214(0.012) \end{bmatrix} \]

\[-2*\text{loglikelihood/IGLS Deviance} = 3045.682\text{(1447 of 1860 cases in use)}\]

General School: Model 1a

\[ \text{gnschool}_{gh} \sim N(X_{gh}, \Omega) \]

\[ \text{gnschool}_{gh} = \beta_{gh}\text{cons} \]

\[ \beta_{gh} = -0.040(0.153) + v_{gh} + u_{gh} + e_{gh} \]

\[ [v_{gh}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.067(0.058) \end{bmatrix} \]

\[ [u_{gh}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.818(0.048) \end{bmatrix} \]

\[ [e_{gh}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.297(0.016) \end{bmatrix} \]

\[-2*\text{loglikelihood/IGLS Deviance} = 4099.512\text{(1567 of 1860 cases in use)}\]

General School: Model 1b

\[ \text{gnschool}_{gh} \sim N(X_{gh}, \Omega) \]

\[ \text{gnschool}_{gh} = \beta_{gh}\text{cons} + 0.602(0.028) \times \text{gnschool}_{gh} \]

\[ \beta_{gh} = -0.039(0.126) + v_{gh} + u_{gh} + e_{gh} \]

\[ [v_{gh}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.045(0.039) \end{bmatrix} \]

\[ [u_{gh}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.444(0.052) \end{bmatrix} \]

\[ [e_{gh}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.296(0.017) \end{bmatrix} \]

\[-2*\text{loglikelihood/IGLS Deviance} = 3398.324\text{(1448 of 1860 cases in use)}\]
General School: Model 2
gschool_{iS} \sim N(X_i, \Omega)

\begin{align*}
gschool_{iS} &= \beta_0 + \text{cons} + 0.602(0.023)\text{lgnschool}_{iS} + -0.029(0.015)\text{time}_{iS} - 0.059(0.028)\text{group}_{iS} + 0.012(0.015)\text{time}_{iS} + \\
\beta_{0S} &= -0.040(0.125) + v_{iS} + u_{iS} + e_{iS} \\
\end{align*}

\begin{align*}
[v_{iS}] &\sim N(0, \Omega_v) : \Omega_v = [0.044(0.038)] \\
[u_{iS}] &\sim N(0, \Omega_u) : \Omega_u = [0.440(0.032)] \\
[e_{iS}] &\sim N(0, \Omega_e) : \Omega_e = [0.295(0.016)] \\

-2*log likelihood (IGLS Deviance) = 3389.034(1448 of 1860 cases in use)

General School: Model 3
gschool_{iS} \sim N(X_i, \Omega)

\begin{align*}
gschool_{iS} &= \beta_0 + \text{cons} + 0.601(0.023)\text{lgnschool}_{iS} + -0.029(0.015)\text{time}_{iS} + 0.061(0.023)\text{group}_{iS} + 0.012(0.015)\text{time}_{iS} + \\
&\quad + 0.016(0.015)\text{lgnschool}\text{time}_{iS} + 0.016(0.016)\text{lgnschool}\text{group}_{iS} + 0.016(0.016)\text{lgnschool}\text{time}_{iS} + \\
\beta_{0S} &= -0.040(0.125) + v_{iS} + u_{iS} + e_{iS} \\
\end{align*}

\begin{align*}
[v_{iS}] &\sim N(0, \Omega_v) : \Omega_v = [0.043(0.037)] \\
[u_{iS}] &\sim N(0, \Omega_u) : \Omega_u = [0.437(0.032)] \\
[e_{iS}] &\sim N(0, \Omega_e) : \Omega_e = [0.294(0.016)] \\

-2*log likelihood (IGLS Deviance) = 3382.778(1448 of 1860 cases in use)

Global Self-Esteem: Model 1a
gself_{iS} \sim N(X_i, \Omega)

gself_{iS} = \beta_0 + \text{cons} + \\
\beta_{0S} &= -0.105(0.109) + v_{iS} + u_{iS} + e_{iS} \\
\end{align*}

\begin{align*}
[v_{iS}] &\sim N(0, \Omega_v) : \Omega_v = [0.032(0.069)] \\
[u_{iS}] &\sim N(0, \Omega_u) : \Omega_u = [0.889(0.053)] \\
[e_{iS}] &\sim N(0, \Omega_e) : \Omega_e = [0.326(0.015)] \\

-2*log likelihood (IGLS Deviance) = 4237.118(156" of 1860 cases in use)
Global Self-Esteem: Model 1b

gself_{pe} \sim N(XB, \Omega)

\beta_{pe} = \beta_{0pe} \text{cons} + 0.578(0.030) \text{time}_{pe} + 0.039(0.016) \text{group}_{pe} + 0.020(0.030) \text{time}_{pe} \text{group}_{pe}

\beta_{e} = -0.082(0.095) + \nu_{e} + \eta_{e} + \epsilon_{e}

\begin{align*}
\nu_{e} & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.024(0.022) \end{bmatrix} \\
\eta_{e} & \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.526(0.037) \end{bmatrix} \\
\epsilon_{e} & \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.324(0.018) \end{bmatrix}
\end{align*}

-2*loglikelihood (IGLS Deviance) = 3578.150 (1450 of 1860 cases in use)

Global Self-Esteem: Model 2

gself_{pe} \sim N(XB, \Omega)

\beta_{pe} = \beta_{0pe} \text{cons} + 0.759(0.030) \text{time}_{pe} + 0.039(0.016) \text{time}_{pe} \text{group}_{pe} + 0.021(0.016) \text{group}_{pe} \text{time}_{pe}

\beta_{e} = -0.084(0.095) + \nu_{e} + \eta_{e} + \epsilon_{e}

\begin{align*}
\nu_{e} & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.024(0.022) \end{bmatrix} \\
\eta_{e} & \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.526(0.037) \end{bmatrix} \\
\epsilon_{e} & \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.320(0.018) \end{bmatrix}
\end{align*}

-2*loglikelihood (IGLS Deviance) = 3569.340 (1450 of 1860 cases in use)

Global Self-Esteem: Model 3

gself_{pe} \sim N(XB, \Omega)

\beta_{pe} = \beta_{0pe} \text{cons} + 0.579(0.030) \text{time}_{pe} + 0.039(0.016) \text{time}_{pe} \text{group}_{pe} + 0.020(0.030) \text{group}_{pe} \text{time}_{pe}

\beta_{e} = -0.058(0.096) + \nu_{e} + \eta_{e} + \epsilon_{e}

\begin{align*}
\nu_{e} & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.024(0.022) \end{bmatrix} \\
\eta_{e} & \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.525(0.037) \end{bmatrix} \\
\epsilon_{e} & \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.319(0.018) \end{bmatrix}
\end{align*}

-2*loglikelihood (IGLS Deviance) = 3565.710 (1450 of 1860 cases in use)
ROPE

Self-Confidence: Model 1a
\[ \text{slfcon}_{p_k} \sim N(\Lambda B, \Omega) \]
\[ \text{slfcon}_{p_k} = \beta_{p_k} \text{cons} + \nu_{p_k} + u_{p_k} + \epsilon_{p_k} \]
\[ [\nu_{p_k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.010(0.012) \end{bmatrix} \]
\[ [u_{p_k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.818(0.052) \end{bmatrix} \]
\[ [\epsilon_{p_k}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.401(0.022) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 4359.248\text{(1570 of 1860 cases in use)}\]

Self-Confidence: Model 1b
\[ \text{slfcon}_{p_k} \sim N(\Lambda B, \Omega) \]
\[ \text{slfcon}_{p_k} = \beta_{p_k} \text{cons} + 0.537(0.031) \text{slfcon}_{p_k} + \nu_{p_k} + u_{p_k} + \epsilon_{p_k} \]
\[ [\nu_{p_k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.008(0.009) \end{bmatrix} \]
\[ [u_{p_k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.543(0.040) \end{bmatrix} \]
\[ [\epsilon_{p_k}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.396(0.022) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 3770.705\text{(1451 of 1860 cases in use)}\]

Self-Confidence: Model 2
\[ \text{slfcon}_{p_k} \sim N(\Lambda B, \Omega) \]
\[ \text{slfcon}_{p_k} = \beta_{p_k} \text{cons} + 0.538(0.031) \text{slfcon}_{p_k} - 0.032(0.017) \text{time}_{p_k} + 0.017(0.021) \text{group}_{p_k} - 0.04(0.019) \text{time}_{p_k} \]
\[ \beta_{p_k} = -0.172(0.060) + \nu_{p_k} + u_{p_k} + \epsilon_{p_k} \]
\[ [\nu_{p_k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.008(0.009) \end{bmatrix} \]
\[ [u_{p_k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.543(0.040) \end{bmatrix} \]
\[ [\epsilon_{p_k}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.396(0.022) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 3758.577\text{(1451 of 1860 cases in use)}\]
**Self-Confidence: Model 3**

\[\text{slicon}_{ik} \sim \mathcal{N}(XB_{ik}, \Omega)\]

\[\text{slicon}_{ik} = \beta_{0k} \text{cons} + 0.533(0.031)\text{t1slicon}_{ik} + -0.031(0.017)\text{time}_{ik} + 0.018(0.031)\text{group}_{ik} + 0.048(0.017)\text{group}_{ik}\text{.time}_{ik} + 0.011(0.015)\text{t1slicon.time}_{ik} + 0.021(0.031)\text{t1slicon.group}_{ik} + -0.035(0.015)\text{t1slicon.group}_{ik}\text{.time}_{ik}\]

\[\beta_{0k} = -0.174(0.061) + v_{0k} + \mu_{0k} + \epsilon_{0k}\]

\[v_{0k} \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.008(0.009) \end{bmatrix}\]

\[\mu_{0k} \sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.548(0.040) \end{bmatrix}\]

\[\epsilon_{0k} \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.386(0.022) \end{bmatrix}\]

-2*loglikelihood (IGLS Deviance) = 3753.697 (1451 of 1860 cases in use)

**Self-Efficacy: Model 1a**

\[\text{slsefc}_{ik} \sim \mathcal{N}(XB_{ik}, \Omega)\]

\[\text{slsefc}_{ik} = \beta_{0k} \text{cons} + \beta_{1k} \text{t1slsefc}_{ik}\]

\[\beta_{0k} = -0.147(0.102) + v_{0k} + \mu_{0k} + \epsilon_{0k}\]

\[v_{0k} \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.028(0.025) \end{bmatrix}\]

\[\mu_{0k} \sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.721(0.048) \end{bmatrix}\]

\[\epsilon_{0k} \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.429(0.023) \end{bmatrix}\]

-2*loglikelihood (IGLS Deviance) = 4339.060 (1570 of 1860 cases in use)

**Self-Efficacy: Model 1b**

\[\text{slsefc}_{ik} \sim \mathcal{N}(XB_{ik}, \Omega)\]

\[\text{slsefc}_{ik} = \beta_{0k} \text{cons} + 0.559(0.029)\text{t1slsefc}_{ik}\]

\[\beta_{0k} = -0.156(0.081) + v_{0k} + \mu_{0k} + \epsilon_{0k}\]

\[v_{0k} \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.011(0.016) \end{bmatrix}\]

\[\mu_{0k} \sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.410(0.025) \end{bmatrix}\]

\[\epsilon_{0k} \sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.431(0.024) \end{bmatrix}\]

-2*loglikelihood (IGLS Deviance) = 3699.308 (1451 of 1860 cases in use)
Self-Efficacy: Model 2
\[ \text{slf}\text{ef}_{e} \sim \mathcal{N}(X_{B}, \Omega) \]
\[ \text{slf}\text{ef}_{e} = \beta_{0} + \text{cons} + 0.559(0.029)\text{slf}\text{ef}_{p} + 0.031(0.018)\text{time}_{p} + 0.028(0.029)\text{group}_{p} + 
0.056(0.018)\text{group} \text{time}_{p} \]
\[ \beta_{0} = -0.150(0.080) + \gamma_{32} + u_{32} + \epsilon_{32} \]
\[ \begin{bmatrix} v_{32} \\ u_{32} \\ \epsilon_{32} \end{bmatrix} \sim \mathcal{N}(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.017(0.016) \\ 0.415(0.035) \\ 0.422(0.023) \end{bmatrix} \]
\[-2\text{loglikelihood (IGLS Deviance)} = 3688.030(1451 of 1860 cases in use) \]

Self-Efficacy: Model 3
\[ \text{slf}\text{ef}_{e} \sim \mathcal{N}(X_{B}, \Omega) \]
\[ \text{slf}\text{ef}_{e} = \beta_{0} + \text{cons} + 0.550(0.029)\text{slf}\text{ef}_{p} + 0.033(0.015)\text{time}_{p} - 0.028(0.029)\text{group}_{p} + 
0.058(0.018)\text{group} \text{time}_{p} + 0.042(0.018)\text{slf}\text{ef}_{p} \text{time}_{p} + 0.008(0.029)\text{slf}\text{ef}_{p} \text{group}_{p} + 
-0.062(0.018)\text{slf}\text{ef}_{p} \text{group} \text{time}_{p} \]
\[ \beta_{0} = -0.149(0.080) + \gamma_{32} + u_{32} + \epsilon_{32} \]
\[ \begin{bmatrix} v_{32} \\ u_{32} \\ \epsilon_{32} \end{bmatrix} \sim \mathcal{N}(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.217(0.016) \\ 0.422(0.023) \\ 0.415(0.023) \end{bmatrix} \]
\[-2\text{loglikelihood (IGLS Deviance)} = 3678.92(1451 of 1860 cases in use) \]

Stress Management: Model 1a
\[ \text{stress}_{e} \sim \mathcal{N}(X_{B}, \Omega) \]
\[ \text{stress}_{e} = \beta_{0} + \text{cons} \]
\[ \beta_{0} = -0.638(0.96) + v_{32} + u_{32} + \epsilon_{32} \]
\[ \begin{bmatrix} v_{32} \\ u_{32} \\ \epsilon_{32} \end{bmatrix} \sim \mathcal{N}(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.624(0.23) \\ 0.679(0.043) \\ 0.477(0.026) \end{bmatrix} \]
\[-2\text{loglikelihood (IGLS Deviance)} = 4385.518(1568 of 1860 cases in use) \]
Stress Management: Model 1b
\[ \text{strmsg}_{i|e} \sim N(\alpha_{i}, \Omega_{e}) \]
\[ \text{strmsg}_{i|e} = \beta_{0e} + \text{cons} + 0.525(0.029)x1\text{strmsg}_{i|e} + \beta_{1e}x1\text{strmsg}_{i|e} + \nu_{i|e} + n_{i|e} + \epsilon_{i|e} \]
\[ [\nu_{i|e}] \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.011(0.011) \end{bmatrix} \]
\[ [n_{i|e}] \sim N(0, \Omega_{n}) : \Omega_{n} = \begin{bmatrix} 0.413(0.037) \end{bmatrix} \]
\[ [\epsilon_{i|e}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.465(0.026) \end{bmatrix} \]
\[-2\times\text{loglikelihood(GLS Deviance)} = 3768.232(1449 of 1860 cases in use)\]

Stress Management: Model 2
\[ \text{strmsg}_{i|e} \sim N(\alpha_{i}, \Omega_{e}) \]
\[ \text{strmsg}_{i|e} = \beta_{0e} + \text{cons} + 0.524(0.029)x1\text{strmsg}_{i|e} + 0.048(0.018)x\text{time}_{i|e} + 0.059(0.029)x\text{group}_{i|e} + 0.017(0.018)\text{group}_{i|e}x\text{time}_{i|e} \]
\[ \beta_{0e} = -0.056(0.067) + \nu_{i|e} + n_{i|e} + \epsilon_{i|e} \]
\[ [\nu_{i|e}] \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.011(0.011) \end{bmatrix} \]
\[ [n_{i|e}] \sim N(0, \Omega_{n}) : \Omega_{n} = \begin{bmatrix} 0.415(0.037) \end{bmatrix} \]
\[ [\epsilon_{i|e}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.458(0.025) \end{bmatrix} \]
\[-2\times\text{loglikelihood(GLS Deviance)} = 757.333(1449 of 1860 cases in use)\]

Stress Management: Model 3
\[ \text{strmsg}_{i|e} \sim N(\alpha_{i}, \Omega_{e}) \]
\[ \text{strmsg}_{i|e} = \beta_{0e} + \text{cons} + 0.521(0.029)x1\text{strmsg}_{i|e} + 0.048(0.018)x\text{time}_{i|e} + 0.066(0.029)x\text{group}_{i|e} + 0.018(0.018)\text{group}_{i|e}x\text{time}_{i|e} + -0.035(0.014)x1\text{strmsg}_{i|e}x\text{time}_{i|e} + -0.026(0.029)x\text{time}_{i|e}x\text{strmsg}_{i|e} + 0.001(0.019)x\text{strmsg}_{i|e}x\text{group}_{i|e}x\text{time}_{i|e} \]
\[ \beta_{0e} = -0.055(0.066) + \nu_{i|e} + n_{i|e} + \epsilon_{i|e} \]
\[ [\nu_{i|e}] \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.010(0.011) \end{bmatrix} \]
\[ [n_{i|e}] \sim N(0, \Omega_{n}) : \Omega_{n} = \begin{bmatrix} 0.416(0.037) \end{bmatrix} \]
\[ [\epsilon_{i|e}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.455(0.025) \end{bmatrix} \]
\[-2\times\text{loglikelihood(GLS Deviance)} = 3752.237(1449 of 1860 cases in use)\]
Open Thinking: Model 1a
\( \text{openmkn}_{jk} \sim N(XB, \Omega) \)

\( \text{openmkn}_{jk} = \beta_{0jk} \text{cons} + \beta_{1jk} \text{time}_{jk} + \varepsilon_{ijk} \)

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.009 & (0.010) \\ 0.009 & 0.789 \end{bmatrix} \]

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.055 & (0.019) \\ 0.055 & 0.355 \end{bmatrix} \]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 4228.238 (1570 of 1860 cases in use)\)

Open Thinking: Model 1b
\( \text{openmkn}_{jk} \sim N(XB, \Omega) \)

\( \text{openmkn}_{jk} = \beta_{0jk} \text{cons} + 0.531(0.030) \text{time}_{jk} + \varepsilon_{ijk} \)

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.006 & (0.007) \\ 0.006 & 0.523 \end{bmatrix} \]

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.342 & (0.019) \\ 0.342 & 0.518 \end{bmatrix} \]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 3620.147 (1451 of 1860 cases in use)\)

Open Thinking: Model 2
\( \text{openmkn}_{jk} \sim N(XB, \Omega) \)

\( \text{openmkn}_{jk} = \beta_{0jk} \text{cons} - 0.531(0.030) \text{time}_{jk} + 0.04(0.008) \text{time}_{jk}^2 + 0.067(0.030) \text{group}_{jk} + 
0.011(0.016) \text{time}_{jk} \text{group}_{jk} \)

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.066 & (0.037) \\ 0.066 & 0.518 \end{bmatrix} \]

\[ \begin{bmatrix} \varepsilon_{ijk} \\ \beta_{0jk} \end{bmatrix} \sim N(0, \Omega_j) \quad \Omega_j = \begin{bmatrix} 0.341 & (0.019) \\ 0.341 & 0.541 \end{bmatrix} \]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 3611.684 (1451 of 1860 cases in use)\)
Open Thinking: Model 3

\[
\text{openthinking}_{ik} \sim N(\alpha + \beta \text{cons} + 0.533 X_{ik} + 0.026 \text{time}_{ik} + 0.067 \text{group}_{ik} + 0.011 \text{time}_{ik} \times \text{group}_{ik} + 0.012 \text{time}_{ik} \times \text{group}_{ik} + 0.013 \text{time}_{ik} \times \text{group}_{ik} + 0.002 \text{time}_{ik} \times \text{group}_{ik} + \varepsilon_{ik})
\]

\[
\beta_{\text{cons}} = -0.090(0.052) + \varepsilon_{\text{cons}} + \varepsilon_{\text{time}} + \varepsilon_{\text{group}} + \varepsilon_{\text{time} \times \text{group}}
\]

-2*Loglikelihood (IGLS Deviance) = 3610.899 (1451 of 1860 cases in use)

Social Effectiveness: Model 1a

\[
\text{social}_{ik} \sim N(\alpha + \beta \text{cons})
\]

\[
\beta_{\text{cons}} = -0.060(0.064) + \varepsilon_{\text{cons}} + \varepsilon_{\text{time}} + \varepsilon_{\text{group}} + \varepsilon_{\text{time} \times \text{group}}
\]

-2*Loglikelihood (IGLS Deviance) = 4304.424 (1567 of 1860 cases in use)

Social Effectiveness: Model 1b

\[
\text{social}_{ik} \sim N(\alpha + \beta \text{cons} + 0.549 X_{ik})
\]

\[
\beta_{\text{cons}} = -0.052(0.051) + \varepsilon_{\text{cons}} + \varepsilon_{\text{time}} + \varepsilon_{\text{group}} + \varepsilon_{\text{time} \times \text{group}}
\]

-2*Loglikelihood (IGLS Deviance) = 3675.139 (1449 of 1860 cases in use)
Social Effectiveness: Model 2

\[ \text{social}_{ik} \sim N(\mu, \Omega) \]

\[ \text{social}_{ik} = \beta_0 + \beta_1 \text{cons} + 0.547(0.031)\text{social}_{ik-1} + 0.006(0.017)\text{time}_{ik} + 0.026(0.030)\text{group}_{ik} + \]
\[ 0.017(0.017)\text{time}_{ik-1} + \epsilon_{ik} \]

\[ \beta_{0i} = -0.050(0.052) + \nu_{0i} + \eta_{0i} + \epsilon_{0i} \]

\[ \begin{bmatrix} \nu_{0i} \\ \eta_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ \begin{bmatrix} \nu_{0i} \\ \eta_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ \begin{bmatrix} \epsilon_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ -2\text{loglikelihood}(IGLS Deviance) = 3673.374 \text{ (1449 of 1860 cases in use)} \]

Social Effectiveness: Model 3

\[ \text{social}_{ik} \sim N(\mu, \Omega) \]

\[ \text{social}_{ik} = \beta_0 + \beta_1 \text{cons} + 0.545(0.030)\text{social}_{ik-1} + 0.004(0.017)\text{time}_{ik} + 0.025(0.030)\text{group}_{ik} + \]
\[ 0.016(0.017)\text{time}_{ik-1} + \epsilon_{ik} \]

\[ \beta_{0i} = -0.050(0.052) + \nu_{0i} + \eta_{0i} + \epsilon_{0i} \]

\[ \begin{bmatrix} \nu_{0i} \\ \eta_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ \begin{bmatrix} \nu_{0i} \\ \eta_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ \begin{bmatrix} \epsilon_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ -2\text{loglikelihood}(IGLS Deviance) = 3662.873 \text{ (1449 of 1860 cases in use)} \]

Cooperative Teamwork: Model 1a

\[ \text{coteam}_{ik} \sim N(\mu, \Omega) \]

\[ \text{coteam}_{ik} = \beta_0 + \beta_1 \text{cons} \]

\[ \beta_{0i} = -0.150(0.064) + \nu_{0i} + \epsilon_{0i} \]

\[ \begin{bmatrix} \nu_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ \begin{bmatrix} \epsilon_{0i} \end{bmatrix} \sim N(0, \Sigma_0) \]

\[ -2\text{loglikelihood}(IGLS Deviance) = 4359.787 \text{ (1570 of 1860 cases in use)} \]
Cooperative Teamwork: Model 1b
\[ \text{coteam}_{jk} \sim N(X_{jk}, \Omega) \]
\[ \beta_{jk} = \beta_{0k} \text{cons} + 0.627(0.030) \text{time}_{jk} + \varepsilon_{jk} \]
\[ v_{jk} \sim N(0, \Lambda_v) : \Lambda_v = \begin{bmatrix} 0.003(0.004) \end{bmatrix} \]
\[ u_{jk} \sim N(0, \Lambda_u) : \Lambda_u = \begin{bmatrix} 0.498(0.037) \end{bmatrix} \]
\[ e_{jk} \sim N(0, \Lambda_e) : \Lambda_e = \begin{bmatrix} 0.374(0.021) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 3668.750 (1451 of 1860 cases in use)

Cooperative Teamwork: Model 2
\[ \text{coteam}_{jk} \sim N(X_{jk}, \Omega) \]
\[ \beta_{jk} = \beta_{0k} \text{cons} + 0.627(0.030) \text{time}_{jk} + \varepsilon_{jk} \]
\[ \beta_{0k} = -0.180(0.043) + v_{jk} + u_{jk} \]
\[ v_{jk} \sim N(0, \Lambda_v) : \Lambda_v = \begin{bmatrix} 0.005(0.004) \end{bmatrix} \]
\[ u_{jk} \sim N(0, \Lambda_u) : \Lambda_u = \begin{bmatrix} 0.502(0.037) \end{bmatrix} \]
\[ e_{jk} \sim N(0, \Lambda_e) : \Lambda_e = \begin{bmatrix} 0.365(0.020) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 3653.038 (1451 of 1860 cases in use)

Cooperative Teamwork: Model 3
\[ \text{coteam}_{jk} \sim N(X_{jk}, \Omega) \]
\[ \beta_{jk} = \beta_{0k} \text{cons} + 0.627(0.030) \text{time}_{jk} + \varepsilon_{jk} \]
\[ \beta_{0k} = -0.154(0.045) + v_{jk} + u_{jk} \]
\[ v_{jk} \sim N(0, \Lambda_v) : \Lambda_v = \begin{bmatrix} 0.005(0.004) \end{bmatrix} \]
\[ u_{jk} \sim N(0, \Lambda_u) : \Lambda_u = \begin{bmatrix} 0.196(0.037) \end{bmatrix} \]
\[ e_{jk} \sim N(0, \Lambda_e) : \Lambda_e = \begin{bmatrix} 0.366(0.020) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 3647.191 (1451 of 1860 cases in use)
Leadership Ability: Model 1a
\[
\text{lead}_{yk} \sim N(\Omega, \Omega)
\]
\[
\text{lead}_{yk} = \beta_{0yk} \text{ cons} + \beta_{1yk} \text{ time}_{yk} + \varepsilon_{yk}
\]
\[
\beta_{0yk} = -0.07(0.056) + \varepsilon_{0yk} + \mu_{yk}
\]
\[
\beta_{1yk} = -0.084(0.032) + \varepsilon_{1yk}
\]
\[
\varepsilon_{yk} \sim N(0, \Omega_{e}) : \quad \Omega_{e} = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.048 \end{bmatrix}
\]
\[
\mu_{yk} \sim N(0, \Omega_{u}) : \quad \Omega_{u} = \begin{bmatrix} 0.738 & 0.048 \\ 0.048 & 0.390 \end{bmatrix}
\]

-2*loglikelihood (IGLS Deviance) = 4259.741 (1570 of 1860 cases in use)

Leadership Ability: Model 1b
\[
\text{lead}_{yk} \sim N(\Omega, \Omega)
\]
\[
\text{lead}_{yk} = \beta_{0yk} \text{ cons} + 0.530(0.029) \text{time}_{yk} + \beta_{1yk} \text{ lead}_{yk} + \varepsilon_{yk}
\]
\[
\beta_{0yk} = -0.070(0.056) + \varepsilon_{0yk} + \mu_{yk}
\]
\[
\beta_{1yk} = -0.084(0.032) + \varepsilon_{1yk} + \mu_{yk}
\]
\[
\varepsilon_{yk} \sim N(0, \Omega_{e}) : \quad \Omega_{e} = \begin{bmatrix} 0.000 & 0.008 \\ 0.008 & 0.393 \end{bmatrix}
\]
\[
\mu_{yk} \sim N(0, \Omega_{u}) : \quad \Omega_{u} = \begin{bmatrix} 0.430 & 0.035 \\ 0.035 & 0.393 \end{bmatrix}
\]

-2*loglikelihood (IGLS Deviance) = 3630.621 (1449 of 1860 cases in use)

Leadership Ability: Model 2
\[
\text{lead}_{yk} \sim N(\Omega, \Omega)
\]
\[
\text{lead}_{yk} = \beta_{0yk} \text{ cons} + 0.530(0.029) \text{time}_{yk} + \beta_{1yk} \text{ time}_{yk} + \beta_{2yk} \text{ group}_{yk} + 0.014(0.017) \text{time}_{yk} + 0.054(0.029) \text{time}_{yk}
\]
\[
\beta_{0yk} = -0.070(0.056) + \varepsilon_{0yk} + \mu_{yk}
\]
\[
\beta_{1yk} = -0.084(0.032) + \varepsilon_{1yk} + \mu_{yk}
\]
\[
\beta_{2yk} = -0.084(0.032) + \varepsilon_{2yk}
\]
\[
\varepsilon_{yk} \sim N(0, \Omega_{e}) : \quad \Omega_{e} = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.393 \end{bmatrix}
\]
\[
\mu_{yk} \sim N(0, \Omega_{u}) : \quad \Omega_{u} = \begin{bmatrix} 0.426 & 0.025 \\ 0.025 & 0.393 \end{bmatrix}
\]

-2*loglikelihood (IGLS Deviance) = 3625.318 (1449 of 1860 cases in use)
Leadership Ability: Model 3
\[
\text{lead}_{jk} \sim N(XB, \Omega)
\]
\[
\text{lead}_{jk} = \beta_0 + \beta_1 \text{time}_{jk} + \beta_2 \text{group}_{jk} + 
\beta_3 \text{time}_{jk} \text{group}_{jk} + 
\beta_4 \text{time}_{jk} \text{lead}_{jk} \text{group}_{jk} + 
\beta_5 \text{time}_{jk} \text{lead}_{jk} \text{group}_{jk} \text{time}_{jk} + 
\epsilon_{jk}
\]
\[
\beta_{0jk} = -0.076(0.054) + v_{0jk} + u_{0jk} + \epsilon_{0jk}
\]
\[
[v_{0jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.006(0.007) \end{bmatrix}
\]
\[
[u_{0jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.439(0.043) \end{bmatrix}
\]
\[
[\epsilon_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.399(0.022) \end{bmatrix}
\]
\[-2 \log \text{likelihood (IGLS Deviance)} = 3622.866 \text{ (1449 of 1860 cases in use)}\]

Time Efficiency: Model 1a
\[
\text{timeefc}_{jk} \sim N(XB, \Omega)
\]
\[
\text{timeefc}_{jk} = \beta_0 + \beta_1 \text{cons}
\]
\[
\beta_{0jk} = -0.154(0.107) + v_{0jk} + u_{0jk} + \epsilon_{0jk}
\]
\[
[v_{0jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.031(0.028) \end{bmatrix}
\]
\[
[u_{0jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.694(0.045) \end{bmatrix}
\]
\[
[\epsilon_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.371(0.020) \end{bmatrix}
\]
\[-2 \log \text{likelihood (IGLS Deviance)} = 4179.264 \text{ (1569 of 1860 cases in use)}\]

Time Efficiency: Model 1b
\[
\text{timeefc}_{jk} \sim N(XB, \Omega)
\]
\[
\text{timeefc}_{jk} = \beta_0 + \beta_1 \text{cons} + 0.514(0.025) \text{time}_{jk} \text{timeefc}_{jk}
\]
\[
\beta_{0jk} = -0.152(0.053) + v_{0jk} + u_{0jk} + \epsilon_{0jk}
\]
\[
[v_{0jk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.018(0.017) \end{bmatrix}
\]
\[
[u_{0jk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.425(0.034) \end{bmatrix}
\]
\[
[\epsilon_{0jk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.373(0.021) \end{bmatrix}
\]
\[-2 \log \text{likelihood (IGLS Deviance)} = 3581.166 \text{ (1450 of 1860 cases in use)}\]
Time Efficiency: Model 2
\( t\text{meefc}_{q,k} \sim N(\text{XB}, \Omega) \)
\[ t\text{meefc}_{q,k} = \beta_{0q,k} + 0.510(0.028)t\text{meefc}_{q,k} + 0.016(0.017)t\text{ime}_{q,k} + 0.044(0.028)\text{group}_{q,k} + 0.049(0.017)t\text{ime}_{q,k} \times \text{group}_{q,k} \]
\[ \beta_{0q,k} = -0.148(0.083) + v_{k} + u_{q,k} + e_{2q,k} \]
\[ [v_{k}] \sim N(0, \Omega_v) : \Omega_v = [0.018(0.017)] \]
\[ [u_{q,k}] \sim N(0, \Omega_u) : \Omega_u = [0.426(0.034)] \]
\[ [e_{2q,k}] \sim N(0, \Omega_e) : \Omega_e = [0.568(0.020)] \]
\(-2\text{loglikelihood(IGLS Deviance)} = 3570.467(1450 of 1860 cases in use)\)

Time Efficiency: Model 3
\( t\text{meefc}_{q,k} \sim N(\text{XB}, \Omega) \)
\[ t\text{meefc}_{q,k} = \beta_{0q,k} + 0.509(0.029)t\text{meefc}_{q,k} + 0.017(0.017)t\text{ime}_{q,k} + 0.044(0.028)\text{group}_{q,k} + 0.050(0.017)t\text{ime}_{q,k} \times \text{group}_{q,k} \]
\[ \beta_{0q,k} = -0.147(0.083) + v_{k} + u_{q,k} + e_{2q,k} \]
\[ [v_{k}] \sim N(0, \Omega_v) : \Omega_v = [0.018(0.017)] \]
\[ [u_{q,k}] \sim N(0, \Omega_u) : \Omega_u = [0.426(0.034)] \]
\[ [e_{2q,k}] \sim N(0, \Omega_e) : \Omega_e = [0.568(0.020)] \]
\(-2\text{loglikelihood(IGLS Deviance)} = 3569.951(1450 of 1860 cases in use)\)

Quality Seeking: Model 1a
\( q\text{lytsk}_{q,k} \sim N(\text{XB}, \Omega) \)
\[ q\text{lytsk}_{q,k} = \beta_{0q,k} + cons \]
\[ \beta_{0q,k} = -0.262(0.104) + v_{q,k} + u_{q,k} + e_{2q,k} \]
\[ [v_{q,k}] \sim N(0, \Omega_v) : \Omega_v = [0.028(0.026)] \]
\[ [u_{q,k}] \sim N(0, \Omega_u) : \Omega_u = [0.849(0.056)] \]
\[ [e_{2q,k}] \sim N(0, \Omega_e) : \Omega_e = [0.491(0.026)] \]
\(-2\text{loglikelihood(IGLS Deviance)} = 4568.765(1570 of 1860 cases in use)\)
Quality Seeking: Model 1b
\[ q\text{lysk}_{ijk} \sim N(XB, \Omega) \]
\[ q\text{lysk}_{ijk} = \beta_{0}e^{\text{cons}} + 0.557(0.032)t1q\text{lysk}_{ijk} + 0.049(0.019)\text{time}_{ijk} + 0.012(0.032)\text{group}_{ijk} + 0.037(0.019)\text{group}_{ijk}\cdot\text{time}_{ijk} \]
\[ \beta_{0} = -0.268(0.092) + v_{0} + u_{0} + e_{0} \]
\[ [v_{0}] \sim N(0, \Omega_{v}) \quad : \quad \Omega_{v} = \begin{bmatrix} 0.022(0.021) \end{bmatrix} \]
\[ [u_{0}] \sim N(0, \Omega_{u}) \quad : \quad \Omega_{u} = \begin{bmatrix} 0.568(0.045) \end{bmatrix} \]
\[ [e_{0}] \sim N(0, \Omega_{e}) \quad : \quad \Omega_{e} = \begin{bmatrix} 0.481(0.027) \end{bmatrix} \]
\[-2*\text{loglikelihood/IGLS Deviance} = 3971.207(1451 of 1860 cases in use)\]

Quality Seeking: Model 2
\[ q\text{lysk}_{ijk} \sim N(XB, \Omega) \]
\[ q\text{lysk}_{ijk} = \beta_{0}e^{\text{cons}} + 0.556(0.033)t1q\text{lysk}_{ijk} + 0.049(0.019)\text{time}_{ijk} + 0.012(0.032)\text{group}_{ijk} + 0.037(0.019)\text{group}_{ijk}\cdot\text{time}_{ijk} \]
\[ \beta_{0} = -0.269(0.091) + v_{0} + u_{0} + e_{0} \]
\[ [v_{0}] \sim N(0, \Omega_{v}) \quad : \quad \Omega_{v} = \begin{bmatrix} 0.022(0.020) \end{bmatrix} \]
\[ [u_{0}] \sim N(0, \Omega_{u}) \quad : \quad \Omega_{u} = \begin{bmatrix} 0.572(0.045) \end{bmatrix} \]
\[ [e_{0}] \sim N(0, \Omega_{e}) \quad : \quad \Omega_{e} = \begin{bmatrix} 0.472(0.026) \end{bmatrix} \]
\[-2*\text{loglikelihood/IGLS Deviance} = 3959.940(1451 of 1860 cases in use)\]

Quality Seeking: Model 3
\[ q\text{lysk}_{ijk} \sim N(XB, \Omega) \]
\[ q\text{lysk}_{ijk} = \beta_{0}e^{\text{cons}} + 0.558(0.033)t1q\text{lysk}_{ijk} + 0.058(0.019)\text{time}_{ijk} + 0.012(0.032)\text{group}_{ijk} + 0.037(0.019)\text{group}_{ijk}\cdot\text{time}_{ijk} \]
\[ \beta_{0} = -0.278(0.092) + v_{0} + u_{0} + e_{0} \]
\[ [v_{0}] \sim N(0, \Omega_{v}) \quad : \quad \Omega_{v} = \begin{bmatrix} 0.022(0.020) \end{bmatrix} \]
\[ [u_{0}] \sim N(0, \Omega_{u}) \quad : \quad \Omega_{u} = \begin{bmatrix} 0.581(0.045) \end{bmatrix} \]
\[ [e_{0}] \sim N(0, \Omega_{e}) \quad : \quad \Omega_{e} = \begin{bmatrix} 0.467(0.026) \end{bmatrix} \]
\[-2*\text{loglikelihood/IGLS Deviance} = 3959.340(1451 of 1860 cases in use)\]
Coping with Change: Model 1a
\[ \text{cpech}_{g \times k} \sim N(\alpha \beta, \Omega) \]
\[ \text{cpech}_{g \times k} = \beta_{0 \times g} \text{cons} + 0.086(0.119) + \varepsilon_{g \times k} + u_{g \times k} + e_{g \times k} \]
\[ [v_{g \times k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.039(0.035) \end{bmatrix} \]
\[ [u_{g \times k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.702(0.046) \end{bmatrix} \]
\[ [e_{g \times k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.399(0.022) \end{bmatrix} \]

\(-2\text{loglikelihood}(IGLS Deviance) = 4254.280\text{ (1569 of 1860 cases in use)}\)

Coping with Change: Model 1b
\[ \text{cpech}_{g \times k} \sim N(X \beta, \Omega) \]
\[ \text{cpech}_{g \times k} = \beta_{0 \times g} \text{cons} + 0.482(0.030) \times 1 \text{cpech}_{g \times k} + 0.090(0.100) \times \varepsilon_{g \times k} + u_{g \times k} + e_{g \times k} \]
\[ [v_{g \times k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.027(0.024) \end{bmatrix} \]
\[ [u_{g \times k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.470(0.037) \end{bmatrix} \]
\[ [e_{g \times k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.402(0.022) \end{bmatrix} \]

\(-2\text{loglikelihood}(IGLS Deviance) = 3704.005\text{ (1450 of 1860 cases in use)}\)

Coping with Change: Model 2
\[ \text{cpech}_{g \times k} \sim N(X \beta, \Omega) \]
\[ \text{cpech}_{g \times k} = \beta_{0 \times g} \text{cons} + 0.485(0.050) \times \text{cpech}_{g \times k} + 0.005(0.031) \times \text{time}_{g \times k} + 0.019(0.035) \text{group}_{g \times k} + 0.028(0.017) \text{time}_{g \times k} \]
\[ \beta_{0 \times g} = -0.088(0.099) - \varepsilon_{g \times k} + u_{g \times k} + e_{g \times k} \]
\[ [v_{g \times k}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.027(0.024) \end{bmatrix} \]
\[ [u_{g \times k}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.470(0.037) \end{bmatrix} \]
\[ [e_{g \times k}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.402(0.022) \end{bmatrix} \]

\(-2\text{loglikelihood}(IGLS Deviance) = 3701.113\text{ (1450 of 1860 cases in use)}\)
Coping with Change: Model 3

cpechq_k = β_{0k} + \beta_{1k} \text{cpechq}_{k-1} + 0.003(0.017)\text{time}_{k} + 0.019(0.029)\text{group}_{k} + 0.027(0.017)\text{group}_{k} \cdot \text{time}_{k} + 0.002(0.018)\text{cpechq}_{k-1} \cdot \text{time}_{k} + 0.056(0.030)\text{cpechq}_{k-1} \cdot \text{group}_{k} + 0.003(0.017)\text{cpechq}_{k-1} \cdot \text{group}_{k} \cdot \text{time}_{k} + \varepsilon_{jk}

\beta_{0k} = -0.087(0.101) + \varepsilon_{0k} + v_{0k} + \xi_{jk}

\begin{align*}
[v_{0k}] & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.028(0.025) \\
0.002(0.003) \\
0.015(0.013) \\
0.041(0.027) 
\end{bmatrix}, \\
[u_{0k}] & \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.466(0.037) \\
0.722(0.041) \\
0.415(0.022) \\
0.410(0.023) 
\end{bmatrix}, \\
[\varepsilon_{jk}] & \sim N(0, \Omega_{\varepsilon}) : \Omega_{\varepsilon} = \begin{bmatrix} 0.398(0.034) \\
0.410(0.023) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}.
\end{align*}

-2*log(likelihood|IGLS Deviance) = 3697.520 (1450 of 1860 cases in use)

Active Involvement: Model 1a

activ\_q_k \sim N(\bar{X}B, \Omega)

activ\_q_k = \beta_{0qk} + \varepsilon_{0qk} + v_{0qk} + \varepsilon_{jk}

\begin{align*}
[v_{0qk}] & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.002(0.003) \\
0.015(0.013) \\
0.415(0.022) \\
0.410(0.023) 
\end{bmatrix}, \\
[u_{0qk}] & \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.398(0.034) \\
0.410(0.023) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}, \\
[\varepsilon_{jk}] & \sim N(0, \Omega_{\varepsilon}) : \Omega_{\varepsilon} = \begin{bmatrix} 0.398(0.034) \\
0.410(0.023) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}.
\end{align*}

-2*log(likelihood|IGLS Deviance) = 4304.552 (1570 of 1860 cases in use)

Active Involvement: Model 1b

activ\_q_k \sim N(\bar{X}B, \Omega)

activ\_q_k = \beta_{0qk} + \varepsilon_{0qk} + 0.595(0.028)\text{activ}_{q,k-1}

\begin{align*}
[v_{0qk}] & \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.003(0.005) \\
0.015(0.013) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}, \\
[u_{0qk}] & \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.398(0.034) \\
0.410(0.023) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}, \\
[\varepsilon_{jk}] & \sim N(0, \Omega_{\varepsilon}) : \Omega_{\varepsilon} = \begin{bmatrix} 0.398(0.034) \\
0.410(0.023) \\
0.410(0.023) \\
0.410(0.023) 
\end{bmatrix}.
\end{align*}

-2*log(likelihood|IGLS Deviance) = 3632.837 (1451 of 1860 cases in use)
Active Involvement: Model 2

\[ \text{actinv}_{ik} \sim N(\Omega, \Omega) \]

\[ \text{actinv}_{ik} = \beta_{0ik} + \beta_{1ik}\text{cons} + 0.596(0.028)\text{actinv}_{ik} + -0.060(0.017)\text{time}_{ik} + 0.000(0.028)\text{group}_{ik} + 0.038(0.017)\text{time}_{ik} \]

\[ \beta_{0ik} = -0.157(0.044) + v_{0i} + u_{0i} + \epsilon_{0i} \]

\[ \begin{bmatrix} v_{0i} \\ u_{0i} \\ \epsilon_{0i} \end{bmatrix} \sim N(\Omega_0, \Omega_0) \]

\[ \Omega = \begin{bmatrix} 0.003(0.005) & 0.003(0.005) & 0.003(0.005) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \end{bmatrix} \]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 3615.244(1451 of 1860 cases in use)\]

Active Involvement: Model 3

\[ \text{actinv}_{ik} \sim N(\Omega, \Omega) \]

\[ \text{actinv}_{ik} = \beta_{0ik} + 0.586(0.028)\text{actinv}_{ik} + -0.059(0.017)\text{time}_{ik} + 0.002(0.028)\text{group}_{ik} + 0.038(0.017)\text{time}_{ik} \]

\[ \beta_{0ik} = -0.157(0.044) + v_{0i} + u_{0i} + \epsilon_{0i} \]

\[ \begin{bmatrix} v_{0i} \\ u_{0i} \\ \epsilon_{0i} \end{bmatrix} \sim N(\Omega_0, \Omega_0) \]

\[ \Omega = \begin{bmatrix} 0.003(0.005) & 0.003(0.005) & 0.003(0.005) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \end{bmatrix} \]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 3607.698(1451 of 1560 cases in use)\]

Overall Effectiveness: Model 1a

\[ \text{overref}_{ik} \sim N(\Omega, \Omega) \]

\[ \text{overref}_{ik} = \beta_{0ik}\text{cons} \]

\[ \beta_{0ik} = -0.116(0.059) + v_{1i} + u_{1i} + \epsilon_{1i} \]

\[ \begin{bmatrix} v_{1i} \\ u_{1i} \\ \epsilon_{1i} \end{bmatrix} \sim N(\Omega_1, \Omega_1) \]

\[ \Omega = \begin{bmatrix} 0.003(0.005) & 0.003(0.005) & 0.003(0.005) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \\ 0.003(0.005) & 0.401(0.034) & 0.401(0.034) \end{bmatrix} \]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 4336.502(1570 of 1860 cases in use)\]

447
**Overall Effectiveness: Model 1b**

\[ \text{overef}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{overef}_{pk} = \beta_{\text{cons}} + 0.529(0.030) \times \text{overef}_{pk} - 0.117(0.056) + \nu_{pk} + u_{pk} + \epsilon_{pk} \]

\[
\begin{bmatrix}
\nu_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_c): \Omega_c = [0.007(0.008)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_o): \Omega_o = [0.515(0.040)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_e): \Omega_e = [0.409(0.023)]
\]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 3769.030\) (1451 of 1860 cases in use)

**Overall Effectiveness: Model 2**

\[ \text{overef}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{overef}_{pk} = \beta_{\text{cons}} + 0.529(0.030) \times \text{overef}_{pk} + 0.022(0.017) \times \text{time}_{pk} + 0.034(0.021) \times \text{group}_{pk} + 0.015(0.017) \times \text{time}_{pk} \\
\beta_{\text{cons}} = -0.115(0.056) + v_{pk} + u_{pk} + \epsilon_{pk} \]

\[
\begin{bmatrix}
\nu_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_c): \Omega_c = [0.007(0.008)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_o): \Omega_o = [0.515(0.040)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_e): \Omega_e = [0.407(0.023)]
\]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 3765.638\) (1451 of 1860 cases in use)

**Overall Effectiveness: Model 3**

\[ \text{overef}_{pk} \sim N(X_{pk}, \Omega) \]

\[ \text{overef}_{pk} = \beta_{\text{cons}} + 0.529(0.030) \times \text{overef}_{pk} - 0.025(0.017) \times \text{time}_{pk} + 0.034(0.021) \times \text{group}_{pk} + 0.019(0.017) \times \text{group}_{pk} \times \text{time}_{pk} \\
\beta_{\text{cons}} = -0.115(0.056) + v_{pk} + u_{pk} + \epsilon_{pk} \]

\[
\begin{bmatrix}
\nu_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_c): \Omega_c = [0.007(0.008)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_o): \Omega_o = [0.523(0.029)]
\]

\[
\begin{bmatrix}
u_{pk} \\
u_{pk}
\end{bmatrix} \sim N(0, \Omega_e): \Omega_e = [0.397(0.022)]
\]

\(-2 \times \text{loglikelihood(IGLS Deviance)} = 3750.588\) (1451 of 1860 cases in use)
CSI

Problem Solve: Model 1a
prbsol_{ig} \sim N(XB, \Omega)
prbsol_{ig} = \beta_{ig} + \epsilon_{ig}
\beta_{ig} = -0.072(0.111) + v_{ig} + u_{ig} + \epsilon_{ig}

\begin{align*}
[v_{ig}] & \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.034(0.030) \end{bmatrix} \\
[u_{ig}] & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.678(0.046) \end{bmatrix} \\
[\epsilon_{ig}] & \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.380(0.021) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 4002.782 (1495 of 1860 cases in use)

Problem Solve: Model 1b
prbsol_{ig} \sim N(XB, \Omega)
prbsol_{ig} = \beta_{ig} + \epsilon_{ig}
\beta_{ig} = -0.071(0.082) + v_{ig} + u_{ig} + \epsilon_{ig}

\begin{align*}
[v_{ig}] & \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.017(0.016) \end{bmatrix} \\
[u_{ig}] & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.495(0.039) \end{bmatrix} \\
[\epsilon_{ig}] & \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.378(0.022) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 3471.324 (1365 of 1860 cases in use)

Problem Solve: Model 2
prbsol_{ig} \sim N(XB, \Omega)
prbsol_{ig} = \beta_{ig} + \epsilon_{ig}
\beta_{ig} = -0.052(0.030) + v_{ig} + u_{ig} + \epsilon_{ig}

\begin{align*}
[v_{ig}] & \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.017(0.016) \end{bmatrix} \\
[u_{ig}] & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.495(0.039) \end{bmatrix} \\
[\epsilon_{ig}] & \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.378(0.022) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 3458.608 (1365 of 1860 cases in use)
Problem Solve: Model 3

\[ prbsol_{pk} \sim N(XB, \Omega) \]

\[ prbsol_{pk} = \beta_{pk} cons + 0.439(0.031) \times 1 prbsol_{pk} + -0.054(0.017) time_{pk} + 0.017(0.030) group_{pk} + -0.023(0.017) group time_{pk} + -0.011(0.018) \times 1 prbsol time_{pk} + -0.008(0.031) \times 1 prbsol group_{pk} + 0.029(0.018) \times 1 prbsol group time_{pk} \]

\[ \beta_{pk} = -0.077(0.082) + v_{VK} + u_{VK} + e_{VK} \]

\[ \begin{bmatrix} v_{VK} \\ u_{VK} \\ e_{VK} \end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix} 0.017(0.016) \\ 0.010(0.011) \\ 0.370(0.022) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 3455.245 \text{ (1365 of 1860 cases in use)} \]

Support Seek: Model 1a

\[ supsek_{pk} \sim N(XB, \Omega) \]

\[ supsek_{pk} = \beta_{pk} cons \]

\[ \beta_{pk} = -0.012(0.066) + v_{3c} + u_{3c} + e_{3c} \]

\[ \begin{bmatrix} v_{3c} \\ u_{3c} \\ e_{3c} \end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix} 0.010(0.011) \\ 0.594(0.040) \\ 0.343(0.019) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 3829.641 \text{ (1495 of 1860 cases in use)} \]

Support Seek: Model 1b

\[ supsek_{pk} \sim N(XB, \Omega) \]

\[ supsek_{pk} = \beta_{pk} cons + 0.4^{*}0.0.02^{*} \times 1 supsek_{pk} \]

\[ \beta_{pk} = -0.001(0.027) + v_{3c} + u_{3c} + e_{3c} \]

\[ \begin{bmatrix} v_{3c} \\ u_{3c} \\ e_{3c} \end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix} 0.000(0.000) \\ 0.373(0.031) \\ 0.342(0.020) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 3228.926 \text{ (1364 of 1860 cases in use)} \]
Support Seek: Model 2
\[ \text{supseek}_{pk} \sim N(\mu, \Omega) \]
\[ \text{supseek}_{pk} = \beta_0 + \text{cons} + 0.470(0.027) \times \text{supseek}_{pk} - 0.002(0.017) \times \text{time}_{pk} - 0.038(0.027) \times \text{group}_{pk} - 0.021(0.017) \times \text{group}_{pk} \times \text{time}_{pk} \]
\[ \beta_{0pk} = 0.000(0.027) + v_{0pk} + u_{0pk} + e_{0pk} \]
\[ \begin{bmatrix} v_{0pk} \\ u_{0pk} \\ e_{0pk} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \\ 0.372(0.031) \\ 0.341(0.020) \end{bmatrix} \]
\[-2* \text{loglikelihood (IGLS Deviance)} = 3225.437 \text{(1364 of 1860 cases in use)} \]

Support Seek: Model 3
\[ \text{supseek}_{pk} \sim N(\mu, \Omega) \]
\[ \text{supseek}_{pk} = \beta_0 + \text{cons} + 0.470(0.027) \times \text{supseek}_{pk} - 0.002(0.016) \times \text{time}_{pk} - 0.038(0.027) \times \text{group}_{pk} + 0.022(0.017) \times \text{group}_{pk} \times \text{time}_{pk} - 0.289(0.017) \times \text{supseek}_{pk} \times \text{time}_{pk} - 0.072(0.027) \times \text{supseek}_{pk} \times \text{group}_{pk} + 0.004(0.017) \times \text{supseek}_{pk} \times \text{group}_{pk} \times \text{time}_{pk} \]
\[ \beta_{0pk} = 0.000(0.027) + v_{0pk} + u_{0pk} + e_{0pk} \]
\[ \begin{bmatrix} v_{0pk} \\ u_{0pk} \\ e_{0pk} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \\ 0.368(0.031) \\ 0.339(0.020) \end{bmatrix} \]
\[-2* \text{loglikelihood (IGLS Deviance)} = 3215.877 \text{(1364 of 1860 cases in use)} \]

Avoidance: Model 1a
\[ \text{avoid}_{pk} \sim N(\mu, \Omega) \]
\[ \text{avoid}_{pk} = \beta_0 + \text{cons} \]
\[ \beta_{0pk} = -0.126(0.056) + v_{0pk} + u_{0pk} - e_{0pk} \]
\[ \begin{bmatrix} v_{0pk} \\ u_{0pk} \\ e_{0pk} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.001) \\ 0.630(0.042) \\ 0.343(0.019) \end{bmatrix} \]
\[-2* \text{loglikelihood (IGLS Deviance)} = 3868.306 \text{(1496 of 1860 cases in use)} \]
Avoidance: Model 1b
avoid_{pk} \sim N(\lambda_{k}, \Omega)
\beta_{pk} = \beta_{pk\text{cons}} + 0.506(0.026)\text{avoid}_{pk}
\beta_{pk} = -0.152(0.027) + u_{pk} + \epsilon_{pk}
\left[ v_{pk} \right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\left[ u_{pk} \right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.358(0.030) \end{bmatrix}
\left[ \epsilon_{pk} \right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.331(0.019) \end{bmatrix}
-2\log\text{likelihood(IGLS Deviance)} = 3184.160(1365 of 1860 cases in use)

Avoidance: Model 2
avoid_{pk} \sim N(\lambda_{k}, \Omega)
\beta_{pk} = \beta_{pk\text{cons}} + 0.508(0.027)\text{avoid}_{pk} + -0.039(0.016)\text{time}_{pk} + 0.009(0.027)\text{group}_{pk} +
-0.046(0.016)\text{group}\cdot\text{time}_{pk}
\beta_{pk} = -0.159(0.027) + u_{pk} + \epsilon_{pk}
\left[ v_{pk} \right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\left[ u_{pk} \right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.358(0.030) \end{bmatrix}
\left[ \epsilon_{pk} \right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.326(0.019) \end{bmatrix}
-2\log\text{likelihood(IGLS Deviance)} = 3170.588(1365 of 1860 cases in use)

Avoidance: Model 3
avoid_{pk} \sim N(\lambda_{k}, \Omega)
\beta_{pk} = \beta_{pk\text{cons}} + 0.502(0.027)\text{avoid}_{pk} + -0.039(0.016)\text{time}_{pk} + 0.008(0.027)\text{group}_{pk} +
-0.046(0.016)\text{group}\cdot\text{time}_{pk} - 0.025(0.016)\text{avoid}\cdot\text{time}_{pk} + -0.044(0.027)\text{avoid}\cdot\text{group}_{pk} -
-0.004(0.016)\text{avoid}\cdot\text{group}\cdot\text{time}_{pk}
\beta_{pk} = -0.165(0.027) + v_{pk} + u_{pk} + \epsilon_{pk}
\left[ v_{pk} \right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\left[ u_{pk} \right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.356(0.030) \end{bmatrix}
\left[ \epsilon_{pk} \right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.325(0.019) \end{bmatrix}
-2\log\text{likelihood(IGLS Deviance)} = 3164.032(1365 of 1860 cases in use)
APRI-A
Pro-Bully: Model 1a
\[ \text{problly}_{jk} \sim N(\mu_k, \Omega) \]
\[ \text{problly}_{jk} = \beta_{pqk}\text{cons} + \varepsilon_{jk} \]
\[ \beta_{pqk} = 0.029(0.042) + \varepsilon_{jk} + \theta_{pqk} \]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\varepsilon} = 
\begin{bmatrix}
0.002 & 0.004 \\
0.004 & 0.007
\end{bmatrix}
\]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\theta} = 
\begin{bmatrix}
0.031 & 0.047 \\
0.047 & 0.066
\end{bmatrix}
\]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\epsilon} = 
\begin{bmatrix}
0.024 & 0.023 \\
0.023 & 0.043
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 4035.823 (1473 of 1860 cases in use)

Pro-Bully: Model 1b
\[ \text{problly}_{jk} = \beta_{pqk}\text{cons} + 0.467(0.031)\text{time1}\text{problly}_{jk} \]
\[ \beta_{pqk} = 0.023(0.063) + \varepsilon_{jk} + \theta_{pqk} \]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\varepsilon} = 
\begin{bmatrix}
0.009 & 0.010 \\
0.010 & 0.040
\end{bmatrix}
\]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\theta} = 
\begin{bmatrix}
0.473 & 0.040 \\
0.040 & 0.421
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 3470.328 (1340 of 1860 cases in use)

Pro-Bully: Model 2
\[ \text{problly}_{jk} = \beta_{pqk}\text{cons} + 0.463(0.031)\text{time1}\text{problly}_{jk} - 0.046(0.018)\text{time2}_{jk} - 0.026(0.019)\text{group}\text{time2}_{jk} \]
\[ \beta_{pqk} = 0.017(0.061) + \varepsilon_{jk} + \theta_{pqk} \]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\varepsilon} = 
\begin{bmatrix}
0.008 & 0.009 \\
0.009 & 0.039
\end{bmatrix}
\]
\[
\begin{bmatrix}
\varepsilon_{jk} \\
\theta_{pqk}
\end{bmatrix} \sim N(0, \Omega) : 
\Omega_{\theta} = 
\begin{bmatrix}
0.168 & 0.039 \\
0.039 & 0.417
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 3456.592 (1340 of 1860 cases in use)
Pro-Bully: Model 3
\[
\begin{align*}
\text{probl}_{yk} & \sim N(\mathbf{X}_k \beta, \Sigma), \\
\text{probl}_{yk} & = \beta_0 + \beta_1 \text{cons} + 0.459(0.031) \text{time}_{yk} + 0.047(0.018) \text{time}_{yk}^2 + 0.070(0.031) \text{group}_{yk} + \\
& -0.038(0.018) \text{group}_{yk} \text{time}_{yk} + 0.036(0.019) \text{group}_{yk} \text{time}_{yk}^2 + \\
& -0.007(0.031) \text{group}_{yk} \text{time}_{yk}^2 + 0.005(0.019) \text{group}_{yk} \text{time}_{yk}^2.
\end{align*}
\]
\[
\beta_{yk} = 0.016(0.061) - \nu_{yk} + \mu_{yk} + \varepsilon_{yk},
\]

\[
\begin{bmatrix}
\nu_{yk} \\
\mu_{yk} \\
\varepsilon_{yk}
\end{bmatrix} \sim N(0, \Omega), \quad \Omega = 
\begin{bmatrix}
0.008 & 0.009 \\
0.009 & 0.049 \\
0.009 & 0.024
\end{bmatrix}
\]

-2*\text{loglikelihood(IGLS Deviance)} = 3452.825 (1340 of 1860 cases in use)

Pro-Victim: Model 1a
\[
\begin{align*}
\text{provict}_{yk} & \sim N(\mathbf{X}_k \beta, \Sigma), \\
\text{provict}_{yk} & = \beta_0 + \beta_1 \text{cons} + 0.16(0.035) + \nu_{yk} + \mu_{yk} + \varepsilon_{yk},
\end{align*}
\]

\[
\begin{bmatrix}
\nu_{yk} \\
\mu_{yk} \\
\varepsilon_{yk}
\end{bmatrix} \sim N(0, \Omega), \quad \Omega = 
\begin{bmatrix}
0.001 & 0.003 \\
0.003 & 0.041 \\
0.003 & 0.030
\end{bmatrix}
\]

-2*\text{loglikelihood(IGLS Deviance)} = 3970.896 (1473 of 1860 cases in use)

Pro-Victim: Model 1b
\[
\begin{align*}
\text{provict}_{yk} & \sim N(\mathbf{X}_k \beta, \Sigma), \\
\text{provict}_{yk} & = \beta_0 + \beta_1 \text{cons} + 0.288(0.030) + 0.536(0.030),
\end{align*}
\]

\[
\begin{bmatrix}
\nu_{yk} \\
\mu_{yk} \\
\varepsilon_{yk}
\end{bmatrix} \sim N(0, \Omega), \quad \Omega = 
\begin{bmatrix}
0.000 & 0.002 \\
0.002 & 0.365 \\
0.002 & 0.038
\end{bmatrix}
\]

-2*\text{loglikelihood(IGLS Deviance)} = 3491.202 (1340 of 1860 cases in use)
Pro-Victim: Model 2
provict_{gk} \sim N(XB, \Omega)

\beta_{p_{gk}} = \beta_{p_{cons}} + 0.287(0.030) + \beta_{p_{time}} + 0.022(0.020) + \beta_{p_{time2}} + 0.023(0.029) + \beta_{p_{time3}}

\beta_{p_{cons}} = -0.031(0.029) + v_{gk} + u_{gk} + \epsilon_{p_{gk}}

\begin{bmatrix} v_{gk} \\ u_{gk} \\ \epsilon_{p_{gk}} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.368(0.037) \\ 0.490(0.029) \end{bmatrix}

-2*loglikelihood (IGLS Deviance) = 3481.445 (1340 of 1860 cases in use)

Pro-Victim: Model 3
provict_{gk} \sim N(XB, \Omega)

\beta_{p_{gk}} = \beta_{p_{cons}} + 0.251(0.030) + \beta_{p_{time}} + 0.031(0.020) + \beta_{p_{time2}} + 0.023(0.029) + \beta_{p_{time3}}

\beta_{p_{cons}} = -0.029(0.029) + v_{gk} + u_{gk} + \epsilon_{p_{gk}}

\begin{bmatrix} v_{gk} \\ u_{gk} \\ \epsilon_{p_{gk}} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.362(0.037) \\ 0.498(0.029) \end{bmatrix}

-2*loglikelihood (IGLS Deviance) = 3472.593 (1340 of 1860 cases in use)

Support Scales
Parent Support: Model 1a
parsupp_{k} \sim N(XB, \Omega)

\beta_{s_{k}} = \beta_{s_{cons}}

\beta_{s_{cons}} = -0.147(0.048) + v_{s_{k}} + u_{s_{k}} + \epsilon_{s_{gk}}

\begin{bmatrix} v_{s_{k}} \\ u_{s_{k}} \\ \epsilon_{s_{gk}} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.025(0.019) \\ 1.042(0.067) \\ 0.496(0.027) \end{bmatrix}

-2*loglikelihood (IGLS Deviance) = 4611.720 (1530 of 1860 cases in use)
Parent Support: Model 1b
\[ \text{parsup}_{pk} \sim N(\Omega, \Omega) \]
\[ \text{parsup}_{pk} = \beta_{pk}\text{cons} + 0.566(0.036)\text{1} \times \text{parsup}_{pk} + \beta_{pk}\text{time} + u_{pk} + e_{pk} \]
\[ \left[ \begin{array}{c}
\text{v}_{pk} \\
\text{u}_{pk} \\
\text{e}_{pk}
\end{array} \right] \sim N(0, \Omega) \quad \Omega = \left[ \begin{array}{ccc}
0.024(0.016) \\
0.718(0.054) \\
0.503(0.029)
\end{array} \right] \]

-2*loglikelihood/IGLS Deviance) = 4036.357 (1409 of 1860 cases in use)

Parent Support: Model 2
\[ \text{parsup}_{pk} \sim N(\Omega, \Omega) \]
\[ \text{parsup}_{pk} = \beta_{pk}\text{cons} + 0.565(0.036)\text{1} \times \text{parsup}_{pk} + 0.060(0.020)\text{time} + 0.034(0.045)\text{group} + 0.007(0.020)\text{group} \times \text{time} + u_{pk} + e_{pk} \]
\[ \beta_{pk} = -0.147(0.045) + v_{pk} + e_{pk} \]
\[ \left[ \begin{array}{c}
\text{v}_{pk} \\
\text{u}_{pk} \\
\text{e}_{pk}
\end{array} \right] \sim N(0, \Omega) \quad \Omega = \left[ \begin{array}{ccc}
0.023(0.016) \\
0.717(0.054) \\
0.493(0.028)
\end{array} \right] \]

-2*loglikelihood/IGLS Deviance) = 4026.193 (1409 of 1860 cases in use)

Parent Support: Model 3
\[ \text{parsup}_{pk} \sim N(\Omega, \Omega) \]
\[ \text{parsup}_{pk} = \beta_{pk}\text{cons} - 0.556(0.036)\text{1} \times \text{parsup}_{pk} + 0.065(0.020)\text{time} + 0.012(0.044)\text{group} + 0.005(0.020)\text{group} \times \text{time} + u_{pk} + e_{pk} \]
\[ \beta_{pk} = -0.118(0.044) + v_{pk} - u_{pk} + e_{pk} \]
\[ \left[ \begin{array}{c}
\text{v}_{pk} \\
\text{u}_{pk} \\
\text{e}_{pk}
\end{array} \right] \sim N(0, \Omega) \quad \Omega = \left[ \begin{array}{ccc}
0.022(0.015) \\
0.698(0.053) \\
0.496(0.025)
\end{array} \right] \]

-2*loglikelihood/IGLS Deviance) = 4007.490 (1409 of 1860 cases in use)
Peer Support: Model 1a
\[ \text{persup}_{ik} \sim N(X\beta, \Omega) \]
\[ \text{persup}_{ik} = \beta_0 + \text{cons} + \beta_{2k} \text{cons} + \beta_{4k} \text{persup}_{ik} + \epsilon_{2k} \]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
-2 \times \text{loglikelihood} (IGLS Deviance) = 4209.229 \text{ (1523 of 1860 cases in use)}
\]

Peer Support: Model 1b
\[ \text{persup}_{ik} \sim N(X\beta, \Omega) \]
\[ \text{persup}_{ik} = \beta_0 + \text{cons} + 0.432 \text{persup}_{ik} + \beta_{2k} \text{persup}_{ik} + \beta_{4k} \text{persup}_{ik} + \epsilon_{2k} \]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
-2 \times \text{loglikelihood} (IGLS Deviance) = 3607.671 \text{ (1395 of 1860 cases in use)}
\]

Peer Support: Model 2
\[ \text{persup}_{ik} \sim N(X\beta, \Omega) \]
\[ \text{persup}_{ik} = \beta_0 + \text{cons} + 0.482 \text{persup}_{ik} + 0.014 \text{time}_{ik} + 0.609 \text{group}_{ik} + 0.041 \text{time}_{ik} \text{group}_{ik} \]
\[ \beta_{2k} = -0.666 + \epsilon_{2k} \]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
\begin{bmatrix}
\epsilon_{2k}
\end{bmatrix} \sim N(0, \Omega_{\epsilon})
\]
\[
-2 \times \text{loglikelihood} (IGLS Deviance) = 3601.757 \text{ (1395 of 1860 cases in use)}
\]
Peer Support: Model 3
\[
\text{persup}_{gk} \sim N(\chi_{SB}, \Omega)
\]
\[
\beta_{gk} = \beta_{gk}\text{cons} + 0.477(0.030)\text{t1persup}_{gk} + 0.014(0.018)\text{time}_{gk} + 0.01(0.030)\text{group}_{gk} +
0.042(0.018)\text{group}_{gk} \cdot \text{time}_{gk} - 0.044(0.013)\text{t1persup}.\text{time}_{gk} + 0.053(0.030)\text{t1persup}.\text{group}_{gk} +
-0.031(0.018)\text{t1persup}.\text{group}_{gk} \cdot \text{time}_{gk}
\]
\[
\beta_{gk} = -0.065(0.030) + u_{gk} + u_{gk} + e_{gk}
\]
\[
\begin{bmatrix}
Y_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim N(0, \Omega): \Omega = \begin{bmatrix}
0.000(0.000) \\
0.491(0.039) \\
0.404(0.023)
\end{bmatrix}
\]
\[\text{-2*loglikelihood(GLS Deviance)} = 3589.372(1395 of 1860 cases in use)\]

Enjoyment of School: Model 1a
Enjoyment of School: Model 1a
\[
\text{enjsch}_{gk} \sim N(\chi_{SB}, \Omega)
\]
\[
\beta_{gk} = \beta_{gk}\text{cons}
\]
\[
\beta_{gk} = -0.263(0.057) + v_{gk} + u_{gk} + e_{gk}
\]
\[
\begin{bmatrix}
Y_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim N(0, \Omega): \Omega = \begin{bmatrix}
0.064(0.026) \\
0.902(0.054) \\
0.327(0.018)
\end{bmatrix}
\]
\[\text{-2*loglikelihood(GLS Deviance)} = 4242.604(1555 of 1860 cases in use)\]

Enjoyment of School: Model 1b
Enjoyment of School: Model 1b
\[
\text{enjsch}_{gk} \sim N(\chi_{SB}, \Omega)
\]
\[
\beta_{gk} = \beta_{gk}\text{cons} + 0.644(0.030)\text{t1enjsch}_{gk}
\]
\[
\beta_{gk} = -0.241(0.047) + v_{gk} + u_{gk} + e_{gk}
\]
\[
\begin{bmatrix}
Y_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim N(0, \Omega): \Omega = \begin{bmatrix}
0.043(0.018) \\
0.493(0.036) \\
0.313(0.018)
\end{bmatrix}
\]
\[\text{-2*loglikelihood(GLS Deviance)} = 3513.542(1441 of 1860 cases in use)\]
Enjoyment of School: Model 2
\[ \text{enjsch}_{gk} \sim N(\mu, \Omega) \]
\[ \text{enjsch}_{gk} = \beta_{g0} \text{cons} + 0.642(0.030) \text{tenjsch}_{gk} + 0.003(0.015) \text{time}_{gk} + 0.075(0.045) \text{group}_{gk} + 0.034(0.015) \text{time}_{gk} \]
\[ \beta_{g0} = -0.240(0.045) + \nu_{g0} + \epsilon_{g0} \]
\[ \begin{bmatrix} \nu_{g0} \\ \epsilon_{g0} \end{bmatrix} \sim N(0, \Omega) \]
\[ \Omega = \begin{bmatrix} 0.037(0.016) \\ 0.492(0.036) \\ 0.312(0.018) \end{bmatrix} \]
\[-2*\text{loglikelihood}\text{(IGLS Deviance)} = 3506.130\text{(1441 of 1860 cases in use)}\]

Enjoyment of School: Model 3
\[ \text{enjsch}_{gk} \sim N(\mu, \Omega) \]
\[ \text{enjsch}_{gk} = \beta_{g0} \text{cons} + 0.638(0.030) \text{tenjsch}_{gk} + 0.004(0.015) \text{time}_{gk} + 0.075(0.045) \text{group}_{gk} + 0.037(0.015) \text{group}_{gk} \text{time}_{gk} \]
\[ \beta_{g0} = -0.238(0.045) + \nu_{g0} + \epsilon_{g0} \]
\[ \begin{bmatrix} \nu_{g0} \\ \epsilon_{g0} \end{bmatrix} \sim N(0, \Omega) \]
\[ \Omega = \begin{bmatrix} 0.038(0.016) \\ 0.491(0.036) \\ 0.309(0.017) \end{bmatrix} \]
\[-2*\text{loglikelihood}\text{(IGLS Deviance)} = 3500.152\text{(1441 of 1860 cases in use)}\]
SDQII-S
Emotional Stability: Experimental group

\[ \text{emtsb}_{\text{gk}} \sim N(XB, \Omega) \]
\[ \text{emtsb}_{\text{gk}} = \beta_{\text{gk,cons}} + 0.520(0.041)t\text{emtsb}_{\text{gk}} + 0.038(0.022)\text{time}_{\text{gk}} \]
\[ \beta_{\text{gk}} = 0.143(0.042) + \nu_{\text{gk}} + \mu_{\text{gk}} + \varepsilon_{\text{gk}} \]

\( \begin{bmatrix} \nu_{\text{gk}} \\ \mu_{\text{gk}} \end{bmatrix} \sim N(0, \Omega_{\nu, \mu}) : \Omega_{\nu, \mu} = \begin{bmatrix} 0.005(0.018) \\ 0.460(0.051) \end{bmatrix} \)

\( \begin{bmatrix} \varepsilon_{\text{gk}} \end{bmatrix} \sim N(0, \Omega_{\varepsilon}) : \Omega_{\varepsilon} = \begin{bmatrix} 0.308(0.025) \end{bmatrix} \)

\[-2\text{loglikelihood(IGLS Deviance)} = 1636.656 (685 of 904 cases in use)\]

Emotional Stability: Control group

\[ \text{emtsb}_{\text{gk}} \sim N(XB, \Omega) \]
\[ \text{emtsb}_{\text{gk}} = \beta_{\text{gk,cons}} + 0.637(0.034)t\text{emtsb}_{\text{gk}} + -0.079(0.040)\text{time}_{\text{gk}} \]
\[ \beta_{\text{gk}} = 0.525(0.111) + \nu_{\text{gk}} + \mu_{\text{gk}} + \varepsilon_{\text{gk}} \]

\( \begin{bmatrix} \nu_{\text{gk}} \\ \mu_{\text{gk}} \end{bmatrix} \sim N(0, \Omega_{\nu, \mu}) : \Omega_{\nu, \mu} = \begin{bmatrix} 0.004(0.006) \\ 0.297(0.054) \end{bmatrix} \)

\( \begin{bmatrix} \varepsilon_{\text{gk}} \end{bmatrix} \sim N(0, \Omega_{\varepsilon}) : \Omega_{\varepsilon} = \begin{bmatrix} 0.286(0.022) \end{bmatrix} \)

\[-2\text{loglikelihood(IGLS Deviance)} = 1646.170 (760 of 956 cases in use)\]
ROPE

Self-Confidence: Experimental group

\( \text{slfconf}_{xk} \sim \mathcal{N}(\chi \beta, \Omega) \)

\[ \text{slfconf}_{xk} = \beta_{0xk} \text{cons} + 0.560(0.043) \text{slfconf}_{xk} + 0.016(0.025) \text{time}_{xk} \]

\( \beta_{0xk} = -0.160(0.079) + \nu_{0xk} + u_{0xk} + e_{0xk} \)

\[ [\nu_{0xk}] \sim \mathcal{N}(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.012(0.015) \end{bmatrix} \]

\[ [u_{0xk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.555(0.059) \end{bmatrix} \]

\[ [e_{0xk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.376(0.031) \end{bmatrix} \]

\(-2^{\text{loglikelihood(IGLS Deviance)}} = 1782.256(690 \text{ of } 904 \text{ cases in use})\)

Self-Confidence: Control group

\( \text{slfconf}_{xk} \sim \mathcal{N}(\chi \beta, \Omega) \)

\[ \text{slfconf}_{xk} = \beta_{0xk} \text{cons} + 0.515(0.045) \text{slfconf}_{xk} + -0.080(0.024) \text{time}_{xk} \]

\( \beta_{0xk} = -0.194(0.047) + \nu_{0xk} + u_{0xk} + e_{0xk} \)

\[ [\nu_{0xk}] \sim \mathcal{N}(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.001(0.005) \end{bmatrix} \]

\[ [u_{0xk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.540(0.056) \end{bmatrix} \]

\[ [e_{0xk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.401(0.031) \end{bmatrix} \]

\(-2^{\text{loglikelihood(IGLS Deviance)}} = 1976.814(761 \text{ of } 956 \text{ cases in use})\)

Self-Efficacy: Experimental group

\( \text{slfefe}_{xk} \sim \mathcal{N}(\chi \beta, \Omega) \)

\[ \text{slfefe}_{xk} = \beta_{0xk} \text{cons} + 0.556(0.042) \text{slfefe}_{xk} + 0.090(0.028) \text{time}_{xk} \]

\( \beta_{0xk} = -0.132(0.100) + \nu_{0xk} + u_{0xk} + e_{0xk} \)

\[ [\nu_{0xk}] \sim \mathcal{N}(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.025(0.024) \end{bmatrix} \]

\[ [u_{0xk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.358(0.052) \end{bmatrix} \]

\[ [e_{0xk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.497(0.040) \end{bmatrix} \]

\(-2^{\text{loglikelihood(IGLS Deviance)}} = 1798.352(690 \text{ of } 904 \text{ cases in use})\)
Self-Efficacy: Control group

\[
\text{slfec}_{\text{gc}} \sim N(\mathbf{X_B}, \boldsymbol{\Omega})
\]

\[
\text{slfec}_{\text{gc}} = \beta_{\text{gc} \text{cons}} + 0.563(0.039) \times \text{slfec}_{\text{gc}} + -0.024(0.022) \text{time}_{\text{gc}}
\]

\[
\beta_{\text{gc} \text{cons}} = -0.167(0.074) + \nu_{\text{gc}} + \omega_{\text{gc}} + \varepsilon_{\text{gc}}
\]

\[
\begin{bmatrix}
\nu_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_i) : \boldsymbol{\Omega}_i = \begin{bmatrix} 0.011(0.013) \end{bmatrix}
\]

\[
\begin{bmatrix}
\omega_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_u) : \boldsymbol{\Omega}_u = \begin{bmatrix} 0.455(0.048) \end{bmatrix}
\]

\[
\begin{bmatrix}
\varepsilon_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_e) : \boldsymbol{\Omega}_e = \begin{bmatrix} 0.360(0.027) \end{bmatrix}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 1879.992\text{ (761 of 956 cases in use)}\]

Cooperative Teamwork: Experimental group

\[
\text{coteam}_{\text{gc}} \sim N(\mathbf{X_B}, \boldsymbol{\Omega})
\]

\[
\text{coteam}_{\text{gc}} = \beta_{\text{gc} \text{cons}} + 0.700(0.041) \times \text{coteam}_{\text{gc}} + 0.002(0.023) \text{time}_{\text{gc}}
\]

\[
\beta_{\text{gc} \text{cons}} = -0.150(0.045) + \nu_{\text{gc}} + \omega_{\text{gc}} + \varepsilon_{\text{gc}}
\]

\[
\begin{bmatrix}
\nu_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_i) : \boldsymbol{\Omega}_i = \begin{bmatrix} 0.001(0.005) \end{bmatrix}
\]

\[
\begin{bmatrix}
\omega_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_u) : \boldsymbol{\Omega}_u = \begin{bmatrix} 0.411(0.047) \end{bmatrix}
\]

\[
\begin{bmatrix}
\varepsilon_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_e) : \boldsymbol{\Omega}_e = \begin{bmatrix} 0.346(0.028) \end{bmatrix}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 1664.192\text{ (690 of 904 cases in use)}\]

Cooperative Teamwork: Control group

\[
\text{coteam}_{\text{gc}} \sim N(\mathbf{X_B}, \boldsymbol{\Omega})
\]

\[
\text{coteam}_{\text{gc}} = \beta_{\text{gc} \text{cons}} + 0.5(0.042) \times \text{coteam}_{\text{gc}} + -0.090(0.023) \text{time}_{\text{gc}}
\]

\[
\beta_{\text{gc} \text{cons}} = -0.189(0.046) + \nu_{\text{gc}} + \omega_{\text{gc}} + \varepsilon_{\text{gc}}
\]

\[
\begin{bmatrix}
\nu_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_i) : \boldsymbol{\Omega}_i = \begin{bmatrix} 0.001(0.005) \end{bmatrix}
\]

\[
\begin{bmatrix}
\omega_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_u) : \boldsymbol{\Omega}_u = \begin{bmatrix} 0.5(0.057) \end{bmatrix}
\]

\[
\begin{bmatrix}
\varepsilon_{\text{gc}}
\end{bmatrix} \sim N(0, \boldsymbol{\Omega}_e) : \boldsymbol{\Omega}_e = \begin{bmatrix} 0.387(0.039) \end{bmatrix}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 1977.597\text{ (761 of 956 cases in use)}\]
**Time Efficiency: Experimental group**

\[ \text{timeeff}_{jk} \sim \mathcal{N}(\Omega, \Omega) \]

\[ \text{timeeff}_{jk} = \beta_{\text{timeeff}} \times \text{cons} + 0.523(0.039) \times \text{timeeff}_{jk} + 0.030(0.021) \times \text{time}_{jk} \]

\[ \beta_{\text{timeeff}} = -0.200(0.077) + \nu_{\text{timeeff}} + \varepsilon_{\text{timeeff}} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.016(0.017) \\ 0.016(0.017) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.406(0.052) \\ 0.406(0.052) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.439(0.036) \\ 0.439(0.036) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 1768.900(690 \text{ of 904 cases in use}) \]

**Time Efficiency: Control group**

\[ \text{timeeff}_{jk} \sim \mathcal{N}(\Omega, \Omega) \]

\[ \text{timeeff}_{jk} = \beta_{\text{timeeff}} \times \text{cons} + 0.523(0.039) \times \text{timeeff}_{jk} + 0.030(0.021) \times \text{time}_{jk} \]

\[ \beta_{\text{timeeff}} = -0.200(0.077) + \nu_{\text{timeeff}} + \varepsilon_{\text{timeeff}} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.016(0.019) \\ 0.016(0.019) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.437(0.044) \\ 0.437(0.044) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{timeeff}} \\ \varepsilon_{\text{timeeff}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.308(0.023) \\ 0.308(0.023) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 1793.898(760 \text{ of 956 cases in use}) \]

**Active Involvement: Experimental group**

\[ \text{active}_{jk} \sim \mathcal{N}(\Omega, \Omega) \]

\[ \text{active}_{jk} = \beta_{\text{active}} \times \text{cons} + 0.622(0.037) \times \text{active}_{jk} + 0.022(0.025) \times \text{time}_{jk} \]

\[ \beta_{\text{active}} = -0.159(0.070) + \nu_{\text{active}} + \varepsilon_{\text{active}} \]

\[ \begin{bmatrix} \nu_{\text{active}} \\ \varepsilon_{\text{active}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.010(0.012) \\ 0.010(0.012) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{active}} \\ \varepsilon_{\text{active}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.413(0.049) \\ 0.413(0.049) \end{bmatrix} \]

\[ \begin{bmatrix} \nu_{\text{active}} \\ \varepsilon_{\text{active}} \end{bmatrix} \sim \mathcal{N}(0, \Omega) : \quad \Omega = \begin{bmatrix} 0.384(0.031) \\ 0.384(0.031) \end{bmatrix} \]

\[ -2 \times \text{loglikelihood(IGLS Deviance)} = 1712.277(690 \text{ of 904 cases in use}) \]
Active Involvement: Control group

\[ \text{actinv}_{pk} \sim N(\mu_B, \Omega) \]
\[ \text{actinv}_{pk} = \beta_{actinv} \text{cons} + 0.564(0.042) \text{actinv}_{pk} + -0.097(0.023) \text{time}_{pk} \]
\[ \beta_{actinv} = -0.166(0.053) + v_{\text{actinv}} + u_{\text{actinv}} + e_{\text{actinv}} \]

\[
\begin{bmatrix}
    v_{\text{actinv}} \\
    u_{\text{actinv}} \\
    e_{\text{actinv}}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.000) \\
0.389(0.046) \\
0.414(0.031)
\end{bmatrix}
\]

\[-2\times \text{loglikelihood(IGLS Deviance)} = 1900.874 (761 of 956 cases in use)\]

CSI

Problem Avoidance: Experimental group

\[ \text{avoid}_{pk} \sim N(\mu_B, \Omega) \]
\[ \text{avoid}_{pk} = \beta_{avoid} \text{cons} + 0.464(0.042) \text{avoid}_{pk} + -0.085(0.023) \text{time}_{pk} \]
\[ \beta_{avoid} = -0.153(0.042) + v_{\text{avoid}} + u_{\text{avoid}} + e_{\text{avoid}} \]

\[
\begin{bmatrix}
    v_{\text{avoid}} \\
    u_{\text{avoid}} \\
    e_{\text{avoid}}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.004) \\
0.429(0.049) \\
0.324(0.025)
\end{bmatrix}
\]

\[-2\times \text{loglikelihood(IGLS Deviance)} = 1549.094 (647 of 904 cases in use)\]

Problem Avoidance: Control group

\[ \text{avoid}_{pk} \sim N(\mu_B, \Omega) \]
\[ \text{avoid}_{pk} = \beta_{avoid} \text{cons} + 0.546(0.044) \text{avoid}_{pk} + -0.006(0.022) \text{time}_{pk} \]
\[ \beta_{avoid} = -0.173(0.035) + v_{\text{avoid}} + u_{\text{avoid}} + e_{\text{avoid}} \]

\[
\begin{bmatrix}
    v_{\text{avoid}} \\
    u_{\text{avoid}} \\
    e_{\text{avoid}}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.000) \\
0.292(0.037) \\
0.326(0.026)
\end{bmatrix}
\]

\[-2\times \text{loglikelihood(IGLS Deviance)} = 1613.248 (718 of 956 cases in use)\]
APR-I-A

Pro-Bully: Experimental group

\[
\begin{align*}
\text{problly}_{jk} &\sim N(\alpha_k, \Omega) \\
\text{problly}_{jk} &= \beta_{0jk}\text{cons} + 0.477(0.044)\text{time}_{jk} + -0.081(0.028)\text{time}_{jk} \\
\beta_{0jk} &= -0.071(0.099) + \nu_{0jk} + \mu_{0jk} + \epsilon_{0jk} \\
\nu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.024(0.024)] \\
\mu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.438(0.058)] \\
\epsilon_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.451(0.039)] \\
\end{align*}
\]

\[-2*\text{loglikelihood/(IGLS Deviance)} = 1646.568(630 of 904 cases in use)\]

Pro-Bully: Control group

\[
\begin{align*}
\text{problly}_{jk} &\sim N(\alpha_k, \Omega) \\
\text{problly}_{jk} &= \beta_{0jk}\text{cons} + 0.470(0.044)\text{time}_{jk} + -0.012(0.024)\text{time}_{jk} \\
\beta_{0jk} &= -0.099(0.052) + \nu_{0jk} + \mu_{0jk} + \epsilon_{0jk} \\
\nu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.002(0.006)] \\
\mu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.480(0.053)] \\
\epsilon_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.390(0.031)] \\
\end{align*}
\]

\[-2*\text{loglikelihood/(IGLS Deviance)} = 1805.370(710 of 956 cases in use)\]

Pro-Victim: Experimental group

\[
\begin{align*}
\text{provic}_{jk} &\sim N(\alpha_k, \Omega) \\
\text{provic}_{jk} &= \beta_{0jk}\text{cons} + 0.205(0.043)\text{time}_{jk} + 0.086(0.028)\text{time}_{jk} \\
\beta_{0jk} &= 0.003(0.044) + \nu_{0jk} + \mu_{0jk} + \epsilon_{0jk} \\
\nu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.000(0.000)] \\
\mu_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.419(0.056)] \\
\epsilon_{0jk} &\sim N(0, \Omega_v) : \Omega_v = [0.457(0.040)] \\
\end{align*}
\]

\[-2*\text{loglikelihood/(IGLS Deviance)} = 1637.510(630 of 904 cases in use)\]
Pro-Victim: Control group
provict\textsubscript{gk} \sim N(XG, \Omega)
provict\textsubscript{gk} = \beta_{0\textsubscript{gk}} + \beta_{1\textsubscript{gk}} \times \text{provict}_{g} + \beta_{2\textsubscript{gk}} \times \text{time}_{gk}
\beta_{0\textsubscript{gk}} = -0.061(0.039) + \nu_{\textsubscript{gk}} + \eta_{\textsubscript{gk}} + \epsilon_{\textsubscript{gk}}
\begin{bmatrix} \nu_{\textsubscript{gk}} \\ \eta_{\textsubscript{gk}} \\ \epsilon_{\textsubscript{gk}} \end{bmatrix} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \\ 0.322(0.049) \\ 0.511(0.041) \end{bmatrix}
-C2*loglikelihood(IGLS Deviance) = 1834.680 (710 of 956 cases in use)

Support Scales
Peer Support: Experimental group
persup\textsubscript{gk} \sim N(XG, \Omega)
persup\textsubscript{gk} = \beta_{0\textsubscript{gk}} + \beta_{1\textsubscript{gk}} \times \text{persup}_{g} + \beta_{2\textsubscript{gk}} \times \text{time}_{gk}
\beta_{0\textsubscript{gk}} = -0.049(0.043) + \nu_{\textsubscript{gk}} + \eta_{\textsubscript{gk}} + \epsilon_{\textsubscript{gk}}
\begin{bmatrix} \nu_{\textsubscript{gk}} \\ \eta_{\textsubscript{gk}} \\ \epsilon_{\textsubscript{gk}} \end{bmatrix} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \\ 0.419(0.054) \\ 0.503(0.042) \end{bmatrix}
-C2*loglikelihood(IGLS Deviance) = 1794.659 (675 of 904 cases in use)

Peer Support: Control group
persup\textsubscript{gk} \sim N(XG, \Omega)
persup\textsubscript{gk} = \beta_{0\textsubscript{gk}} + \beta_{1\textsubscript{gk}} \times \text{persup}_{g} + \beta_{2\textsubscript{gk}} \times \text{time}_{gk}
\beta_{0\textsubscript{gk}} = -0.081(0.042) + \nu_{\textsubscript{gk}} + \eta_{\textsubscript{gk}} + \epsilon_{\textsubscript{gk}}
\begin{bmatrix} \nu_{\textsubscript{gk}} \\ \eta_{\textsubscript{gk}} \\ \epsilon_{\textsubscript{gk}} \end{bmatrix} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \\ 0.525(0.053) \\ 0.541(0.041) \end{bmatrix}
-C2*loglikelihood(IGLS Deviance) = 1821.358 (731 of 956 cases in use)
**Enjoyment of School Scale**

**Enjoyment of School: Experimental group**

\[\text{enjsch}_{ge} \sim N(\chi_{B}, \Omega)\]

\[\text{enjsch}_{ge} = \beta_{0ge} + \beta_{1enjsch_{ge}} + \beta_{2time_{ge}}\]

\[\beta_{0ge} = -0.148(0.154) + \nu_{ge} + \mu_{ge} + \epsilon_{ge}\]

\[
\begin{bmatrix}
\nu_{ge} \\
\mu_{ge} \\
\epsilon_{ge}
\end{bmatrix} \sim N(0, \Omega_{\nu}) \quad \Omega_{\nu} = \begin{bmatrix}
0.066(0.058) \\
0.434(0.051) \\
0.319(0.026)
\end{bmatrix}
\]

\[-2*\text{loglikelihood}(IGLS Deviance) = 1680.630(690 of 904 cases in use)\]

**Enjoyment of School: Control group**

\[\text{enjsch}_{gc} \sim N(\chi_{B}, \Omega)\]

\[\text{enjsch}_{gc} = \beta_{0gc} + \beta_{1enjsch_{gc}} + \beta_{2time_{gc}}\]

\[\beta_{0gc} = -0.305(0.100) + \nu_{gc} + \mu_{gc} + \epsilon_{gc}\]

\[
\begin{bmatrix}
\nu_{gc} \\
\mu_{gc} \\
\epsilon_{gc}
\end{bmatrix} \sim N(0, \Omega_{\nu}) \quad \Omega_{\nu} = \begin{bmatrix}
0.025(0.025) \\
0.486(0.047) \\
0.299(0.022)
\end{bmatrix}
\]

\[-2*\text{loglikelihood}(IGLS Deviance) = 1817.970(762 of 956 cases in use)\]
SDQII-S

Emotional Stability: Time 2
\[ t2\text{emtstb}_y \sim N(XB, \Omega) \]
\[ t2\text{emtstb}_y = \beta_{0y}\text{cons} + 0.584(0.029)t1\text{emtstb}_y + -0.028(0.029)\text{group}_y \]
\[ \beta_{0y} = 0.135(0.032) + u_{0y} + e_{0y} \]
\[
\begin{bmatrix}
u_{0y} \\
e_{0y}
\end{bmatrix} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.001(0.003) \end{bmatrix}
\]
\[
\begin{bmatrix}
u_{0y} \\
e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.658(0.034) \end{bmatrix}
\]

\(-2*\text{loglikelihood}(IGLS Deviance) = 1844.543(762 of 930 cases in use)\)

Emotional Stability: Time 3
\[ t3\text{emtstb}_y \sim N(XB, \Omega) \]
\[ t3\text{emtstb}_y = \beta_{0y}\text{cons} + 0.577(0.033)t1\text{emtstb}_y + 0.039(0.033)\text{group}_y \]
\[ \beta_{0y} = 0.142(0.059) + u_{0y} + e_{0y} \]
\[
\begin{bmatrix}
u_{0y} \\
e_{0y}
\end{bmatrix} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.007(0.009) \end{bmatrix}
\]
\[
\begin{bmatrix}
u_{0y} \\
e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.744(0.040) \end{bmatrix}
\]

\(-2*\text{loglikelihood}(IGLS Deviance) = 1747.716(686 of 930 cases in use)\)
ROPE

Self-Confidence: Time 2
\[ t2\textsf{sfcon}_\gamma \sim N(XB, \Omega) \]
\[ t2\textsf{sfcon}_\gamma = \beta_{\gamma \gamma} \textsf{cons} + 0.514(0.036)t1\textsf{sfcon}_\gamma + -0.028(0.035)\textsf{group}_\gamma \]
\[ \beta_{\gamma \gamma} = -0.130(0.053) + u_{\gamma \gamma} + e_{\gamma \gamma} \]
\[ [u_{\gamma \gamma}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.005(0.007) \end{bmatrix} \]
\[ [e_{\gamma \gamma}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.957(0.049) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2133.905(763 \text{ of 930 cases in use})\]

Self-Confidence: Time 3
\[ t3\textsf{sfcon}_\gamma \sim N(XB, \Omega) \]
\[ t3\textsf{sfcon}_\gamma = \beta_{\gamma \gamma} \textsf{cons} + 0.569(0.037)t1\textsf{sfcon}_\gamma + 0.067(0.036)\textsf{group}_\gamma \]
\[ \beta_{\gamma \gamma} = -0.218(0.073) + u_{\gamma \gamma} + e_{\gamma \gamma} \]
\[ [u_{\gamma \gamma}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.012(0.013) \end{bmatrix} \]
\[ [e_{\gamma \gamma}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.890(0.048) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 1876.316(688 \text{ of 930 cases in use})\]

Self-Efficacy: Time 2
\[ t2\textsf{sfec}_\gamma \sim N(XB, \Omega) \]
\[ t2\textsf{sfec}_\gamma = \beta_{\gamma \gamma} \textsf{cons} + 0.321(0.038)t1\textsf{sfcon}_\gamma + -0.037(0.038)\textsf{group}_\gamma \]
\[ \beta_{\gamma \gamma} = -0.168(0.095) + u_{\gamma \gamma} + e_{\gamma \gamma} \]
\[ [u_{\gamma \gamma}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.023(0.022) \end{bmatrix} \]
\[ [e_{\gamma \gamma}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 1.114(0.057) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2252.751(763 \text{ of 930 cases in use})\]
Self-Efficacy: Time 3
\[ t3sleflc_i \sim \text{N}(XB, \Omega) \]
\[ t3sleflc_i = \beta_{0i}\text{cons} + 0.525(0.034)t1sleflc_i + 0.082(0.034)\text{group}_i \]
\[ \beta_{0i} = -0.126(0.075) + u_{0i} + e_{0i} \]
\[ \begin{bmatrix} u_{0i} \\ e_{0i} \end{bmatrix} \sim \text{N}(0, \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix}) \]
\[ \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix} = \begin{bmatrix} 0.014(0.014) \\ 0.779(0.042) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 1785.555(688 \text{ of } 930 \text{ cases in use})\]

Cooperative Teamwork: Time 2
\[ t2coteam_i \sim \text{N}(XB, \Omega) \]
\[ t2coteam_i = \beta_{0i}\text{cons} + 0.607(0.032)t1coteam_i + -0.048(0.032)\text{group}_i \]
\[ \beta_{0i} = -0.119(0.048) + u_{0i} + e_{0i} \]
\[ \begin{bmatrix} u_{0i} \\ e_{0i} \end{bmatrix} \sim \text{N}(0, \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix}) \]
\[ \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix} = \begin{bmatrix} 0.004(0.006) \\ 0.790(0.041) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 1987.696(763 \text{ of } 930 \text{ cases in use})\]

Cooperative Teamwork: Time 3
\[ t3coteam_i \sim \text{N}(XB, \Omega) \]
\[ t3coteam_i = \beta_{0i}\text{cons} + 0.634(0.037)t1coteam_i + 0.043(0.037)\text{group}_i \]
\[ \beta_{0i} = -0.227(0.040) + u_{0i} + e_{0i} \]
\[ \begin{bmatrix} u_{0i} \\ e_{0i} \end{bmatrix} \sim \text{N}(0, \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix}) \]
\[ \begin{bmatrix} \Omega_u \\ \Omega_e \end{bmatrix} = \begin{bmatrix} 0.001(0.004) \\ 0.926(0.050) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 1900.035(688 \text{ of } 930 \text{ cases in use})\]
Time Efficiency: Time 2
\[ t_{2\text{tmeefc}}_{ij} \sim N(XB, \Omega) \]
\[ t_{2\text{tmeefc}}_{ij} = \beta_{0y}\text{cons} + 0.519(0.033)t_{1\text{tmeefc}}_{ij} + -0.012(0.033)\text{group}_{ij} \]
\[ \beta_{0y} = -0.149(0.071) + u_{0y} + e_{0y} \]

\[ \begin{bmatrix} u_{0y} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.012(0.012) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0y} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.804(0.041) \end{bmatrix} \]

\[ -2*\text{loglikelihood(IGLS Deviance)} = 2003.673(763 \text{ of 930 cases in use}) \]

Time Efficiency: Time 3
\[ t_{3\text{tmeefc}}_{ij} \sim N(XB, \Omega) \]
\[ t_{3\text{tmeefc}}_{ij} = \beta_{0y}\text{cons} + 0.504(0.034)t_{1\text{tmeefc}}_{ij} + 0.096(0.034)\text{group}_{ij} \]
\[ \beta_{0y} = -0.138(0.100) + u_{0y} + e_{0y} \]

\[ \begin{bmatrix} u_{0y} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.026(0.024) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0y} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.768(0.042) \end{bmatrix} \]

\[ -2*\text{loglikelihood(IGLS Deviance)} = 1774.557(687 \text{ of 930 cases in use}) \]

Active Involvement: Time 2
\[ t_{2\text{actinv}}_{ij} \sim N(XB, \Omega) \]
\[ t_{2\text{actinv}}_{ij} = \beta_{0y}\text{cons} + 0.613(0.031)t_{1\text{actinv}}_{ij} + -0.040(0.032)\text{group}_{ij} \]
\[ \beta_{0y} = -0.082(0.048) + u_{0y} + e_{0y} \]

\[ \begin{bmatrix} u_{0y} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.004(0.005) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0y} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.761(0.039) \end{bmatrix} \]

\[ -2*\text{loglikelihood(IGLS Deviance)} = 1958.811(763 \text{ of 930 cases in use}) \]
Active Involvement: Time 3
\[ t3\text{actinv}_i \sim \mathcal{N}(XB, \Omega) \]
\[ t3\text{actinv}_i = \beta_{0i} + 0.065(0.039)\text{group}_i + \beta_{0i}u_{ij} + e_{0i} \]
\[ \beta_{0i} = -0.205(0.040) + u_{0i} + e_{0i} \]
\[
\begin{bmatrix}
  u_{0i} \\
  e_{0i}
\end{bmatrix} \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.000(0.004) \\
  0.002(0.004) \\
  1.138(0.059) \\
  0.642(0.034)
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 2204.411(743 of 930 cases in use)

CSI
Problem Avoidance: Time 2
\[ t2\text{avoid}_i \sim \mathcal{N}(XB, \Omega) \]
\[ t2\text{avoid}_i = \beta_{0i} + 0.545(0.030)t1\text{avoid}_i + 0.058(0.030)\text{group}_i + \beta_{0i}u_{ij} + e_{0i} \]
\[ \beta_{0i} = -0.126(0.042) + u_{0i} + e_{0i} \]
\[
\begin{bmatrix}
  u_{0i} \\
  e_{0i}
\end{bmatrix} \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.002(0.004) \\
  0.642(0.034)
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 1730.677(722 of 930 cases in use)

Problem Avoidance: Time 3
\[ t3\text{avoid}_i \sim \mathcal{N}(XB, \Omega) \]
\[ t3\text{avoid}_i = \beta_{0i} + 0.473(0.033)t1\text{avoid}_i - 0.062(0.034)\text{group}_i + \beta_{0i}u_{ij} + e_{0i} \]
\[ \beta_{0i} = -0.205(0.033) + u_{0i} + e_{0i} \]
\[
\begin{bmatrix}
  u_{0i} \\
  e_{0i}
\end{bmatrix} \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.000(0.000) \\
  0.717(0.040)
\end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 1610.549(643 of 930 cases in use)
APRI-A
Pro-Bully: Time 2
\( t_2 \text{probully}_y \sim N(XB, \Omega) \)
\( t_2 \text{probully}_y = \beta_{0y} \text{cons} + 0.490(0.035)t_1 \text{probully}_y + -0.035(0.035)\text{group}_y \)
\( \beta_{0y} = 0.061(0.043) + u_{0y} + e_{0y} \)
\[
\begin{bmatrix}
  u_{0y} \\
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.002(0.004) \end{bmatrix}
\]
\[
\begin{bmatrix}
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.869(0.046) \end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 1916.602(710 of 930 cases in use)

Pro-Bully: Time 3
\( t_3 \text{probully}_y \sim N(XB, \Omega) \)
\( t_3 \text{probully}_y = \beta_{0y} \text{cons} + 0.424(0.038)t_1 \text{probully}_y + -0.127(0.038)\text{group}_y \)
\( \beta_{0y} = -0.050(0.103) + u_{0y} + e_{0y} \)
\[
\begin{bmatrix}
  u_{0y} \\
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.027(0.026) \end{bmatrix}
\]
\[
\begin{bmatrix}
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.879(0.050) \end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 1712.377(630 of 930 cases in use)

Pro-Victim: Time 2
\( t_2 \text{provict}_y \sim N(XB, \Omega) \)
\( t_2 \text{provict}_y = \beta_{0y} \text{cons} + 0.288(0.037)t_1 \text{provict}_y + -0.017(0.036)\text{group}_y \)
\( \beta_{0y} = -0.058(0.036) + u_{0y} + e_{0y} \)
\[
\begin{bmatrix}
  u_{0y} \\
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]
\[
\begin{bmatrix}
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.916(0.049) \end{bmatrix}
\]
-2*loglikelihood(IGLS Deviance) = 1952.545(710 of 930 cases in use)

473
Pro-Victim: Time 3
\[ t_3provict_y \sim N(XB, \Omega) \]
\[ t_3provict_y = \beta_{y}cons_y + 0.301(0.036)t_1provict_y + 0.089(0.035)group_y \]
\[ \beta_{0y} = 0.006(0.035) + u_{0j} + e_{0y} \]
\[ [u_{0j}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [e_{0y}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.780(0.044) \end{bmatrix} \]

\[-2*loglikelihood(IGLS Deviance) = 1630.930(630 of 930 cases in use)\]

Support Scales
Peer Support: Time 2
\[ t_2persup_y \sim N(XB, \Omega) \]
\[ t_2persup_y = \beta_{y}cons_y + 0.505(0.033)t_1persup_y + -0.037(0.034)group_y \]
\[ \beta_{0y} = -0.073(0.034) + u_{0j} + e_{3y} \]
\[ [u_{0j}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [e_{3y}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.833(0.043) \end{bmatrix} \]

\[-2*loglikelihood(IGLS Deviance) = 1951.451(735 of 930 cases in use)\]

Peer Support: Time 3
\[ t_3persup_y \sim N(XB, \Omega) \]
\[ t_3persup_y = \beta_{y}cons_y + 0.435(0.035)t_1persup_y + 0.058(0.038)group_y \]
\[ \beta_{0y} = -0.058(0.048) + u_{0j} + e_{3y} \]
\[ [u_{0j}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.003(0.006) \end{bmatrix} \]
\[ [e_{3y}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.950(0.052) \end{bmatrix} \]

\[-2*loglikelihood(IGLS Deviance) = 1871.232(671 of 930 cases in use)\]
Enjoyment of School Scale

Enjoyment of School: Time 2

\[ t_{\text{enjsch}\_y} \sim N(XB, \Omega) \]

\[ t_{\text{enjsch}\_y} = \beta_{0y} \text{cons}_y + 0.662(0.031)t_{\text{enjsch}\_y} + 0.026(0.031)\text{group}_y \]

\[ \beta_{0y} = -0.214(0.138) + u_{0y} + e_{0y} \]

\[
\begin{bmatrix}
  u_{0y} \\
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_u): \Omega_u = \begin{bmatrix} 0.054(0.046) \end{bmatrix}
\]

\[
\begin{bmatrix}
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_e): \Omega_e = \begin{bmatrix} 0.742(0.038) \end{bmatrix}
\]

\[ -2^{*}\text{loglikelihood(IGLS Deviance)} = 1938.328(760 \text{ of 930 cases in use}) \]

Enjoyment of School: Time 3

\[ t_{\text{enjsch}\_y} \sim N(XB, \Omega) \]

\[ t_{\text{enjsch}\_y} = \beta_{0y} \text{cons}_y + 0.574(0.035)t_{\text{enjsch}\_y} + 0.125(0.035)\text{group}_y \]

\[ \beta_{0y} = -0.223(0.124) + u_{0y} + e_{0y} \]

\[
\begin{bmatrix}
  u_{0y} \\
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_u): \Omega_u = \begin{bmatrix} 0.042(0.037) \end{bmatrix}
\]

\[
\begin{bmatrix}
  e_{0y}
\end{bmatrix} \sim N(0, \Omega_e): \Omega_e = \begin{bmatrix} 0.831(0.045) \end{bmatrix}
\]

\[ -2^{*}\text{loglikelihood(IGLS Deviance)} = 1843.340(692 \text{ of 930 cases in use}) \]
APPENDIX F-5
BASELINE VARIANCE COMPONENTS MODELS WITH TIME AT LEVEL 1, INDIVIDUAL STUDENT AT LEVEL 2, AND PEER SUPPORT GROUP AT LEVEL 3

SDQII-S
Physical Ability
phyab\_l\_k \sim N(XB, \Omega)
phyab\_l\_k = \beta_{\text{phy}l\_k}\text{Cons}
\beta_{\text{phy}l\_k} = -0.061(0.052) + \nu_{\text{phy}l\_k} + \mu_{\text{phy}l\_k} + \varepsilon_{\text{phy}l\_k}

\begin{bmatrix}

\nu_{\text{phy}l\_k} \\
\mu_{\text{phy}l\_k} \\
\varepsilon_{\text{phy}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.026(0.027) \end{bmatrix}

\begin{bmatrix}

\nu_{\text{phy}l\_k} \\
\mu_{\text{phy}l\_k} \\
\varepsilon_{\text{phy}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.738(0.067) \end{bmatrix}

\begin{bmatrix}

\nu_{\text{phy}l\_k} \\
\mu_{\text{phy}l\_k} \\
\varepsilon_{\text{phy}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.270(0.022) \end{bmatrix}

-2*\text{loglikelihood(IGLS Deviance)} = 1842.220(727 of 1860 cases in use)

Physical Appearance
appear\_l\_k \sim N(XB, \Omega)
appear\_l\_k = \beta_{\text{appear}l\_k}\text{Cons}
\beta_{\text{appear}l\_k} = 0.122(0.057) + \nu_{\text{appear}l\_k} + \mu_{\text{appear}l\_k} + \varepsilon_{\text{appear}l\_k}

\begin{bmatrix}

\nu_{\text{appear}l\_k} \\
\mu_{\text{appear}l\_k} \\
\varepsilon_{\text{appear}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.051(0.032) \end{bmatrix}

\begin{bmatrix}

\nu_{\text{appear}l\_k} \\
\mu_{\text{appear}l\_k} \\
\varepsilon_{\text{appear}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.49(0.066) \end{bmatrix}

\begin{bmatrix}

\nu_{\text{appear}l\_k} \\
\mu_{\text{appear}l\_k} \\
\varepsilon_{\text{appear}l\_k}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.236(0.019) \end{bmatrix}

-2*\text{loglikelihood(IGLS Deviance)} = 1797.235(524 of 1860 cases in use)
Same-Sex Relations
\( \text{smesx}_{xy} \sim N(XB, \Omega) \)
\( \text{smesx}_{xy} = \beta_{xy}\text{cons} \)
\( \beta_{xy} = -0.015(0.046) + v_{xy} + u_{xy} + \theta_{xy} \)
\[
\begin{bmatrix}
v_{xy} \\
u_{xy} \\
\theta_{xy}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.000) \\
0.650(0.063) \\
0.364(0.029)
\end{bmatrix}
\]
\[-2^{\text{loglikelihood (IGLS Deviance)}} = 1909.739(727 of 1860 cases in use)\]

Opposite-Sex Relations
\( \text{oppsx}_{xy} \sim N(XB, \Omega) \)
\( \text{oppsx}_{xy} = \beta_{xy}\text{cons} \)
\( \beta_{xy} = 0.138(0.044) + v_{xy} + u_{xy} + \theta_{xy} \)
\[
\begin{bmatrix}
v_{xy} \\
u_{xy} \\
\theta_{xy}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.000) \\
0.632(0.057) \\
0.273(0.022)
\end{bmatrix}
\]
\[-2^{\text{loglikelihood (IGLS Deviance)}} = 1784.234(727 of 1860 cases in use)\]

Honesty/Trustworthiness
\( \text{honest}_{xy} \sim N(XB, \Omega) \)
\( \text{honest}_{xy} = \beta_{xy}\text{cons} \)
\( \beta_{xy} = 0.005(0.051) + v_{xy} + u_{xy} + \theta_{xy} \)
\[
\begin{bmatrix}
v_{xy} \\
u_{xy} \\
\theta_{xy}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
0.000(0.000) \\
0.901(0.085) \\
0.333(0.027)
\end{bmatrix}
\]
\[-2^{\text{loglikelihood (IGLS Deviance)}} = 1981.068(727 of 1860 cases in use)\]
Parent Relations

parent_{jk} \sim \mathcal{N}(XB, \Omega)

parent_{jk} = \beta_{0jk} + \text{cons}

\beta_{0jk} = -0.129(0.065) + \nu_{jk} + \mu_{0jk} + \epsilon_{0jk}

\begin{align*}
\nu_{jk} &\sim \mathcal{N}(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.055(0.040) \end{bmatrix} \\
\mu_{0jk} &\sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.938(0.091) \end{bmatrix} \\
\epsilon_{0jk} &\sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.375(0.030) \end{bmatrix}
\end{align*}

-2*\text{loglikelihood(IGLS Deviance)} = 2073.797 (727 of 1860 cases in use)

Emotional Stability

emstb_{jk} \sim \mathcal{N}(XB, \Omega)

emstb_{jk} = \beta_{0jk} + \text{cons}

\beta_{0jk} = 0.122(0.053) + \nu_{jk} + \mu_{0jk} + \epsilon_{0jk}

\begin{align*}
\nu_{jk} &\sim \mathcal{N}(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.019(0.027) \end{bmatrix} \\
\mu_{0jk} &\sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.779(0.074) \end{bmatrix} \\
\epsilon_{0jk} &\sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.333(0.027) \end{bmatrix}
\end{align*}

-2*\text{loglikelihood(IGLS Deviance)} = 1939.361 (727 of 1860 cases in use)

Verbal

verbal_{jk} \sim \mathcal{N}(XB, \Omega)

verbal_{jk} = \beta_{0jk} + \text{cons}

\beta_{0jk} = 0.146(0.056) + \nu_{jk} + \mu_{0jk} + \epsilon_{0jk}

\begin{align*}
\nu_{jk} &\sim \mathcal{N}(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.048(0.031) \end{bmatrix} \\
\mu_{0jk} &\sim \mathcal{N}(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.690(0.064) \end{bmatrix} \\
\epsilon_{0jk} &\sim \mathcal{N}(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.248(0.021) \end{bmatrix}
\end{align*}

-2*\text{loglikelihood(IGLS Deviance)} = 1705.206 (683 of 1860 cases in use)
Math
\[ \text{math}_{qk} \sim N(\lambda_{B}, \Omega) \]
\[ \text{math}_{qk} = \beta_{\text{math}, \text{cons}} \]
\[ \beta_{\text{math}, \text{cons}} = -0.055(0.052) + \nu_{\text{math}, \text{cons}} + \epsilon_{\text{math}, \text{cons}} \]
\[ \nu_{\text{math}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \nu_{\text{math}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.980(0.078) \end{bmatrix} \]
\[ \nu_{\text{math}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.218(0.018) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 1850.217(726 \text{ of } 1860 \text{ cases in use}) \]

General School
\[ \text{gnschool}_{pk} \sim N(\lambda_{B}, \Omega) \]
\[ \text{gnschool}_{pk} = \beta_{\text{gnschool}, \text{cons}} \]
\[ \beta_{\text{gnschool}, \text{cons}} = 0.021(0.058) + \nu_{\text{gnschool}, \text{cons}} + \epsilon_{\text{gnschool}, \text{cons}} \]
\[ \nu_{\text{gnschool}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.038(0.033) \end{bmatrix} \]
\[ \nu_{\text{gnschool}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.835(0.077) \end{bmatrix} \]
\[ \nu_{\text{gnschool}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.216(0.024) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 1762.654(668 \text{ of } 1860 \text{ cases in use}) \]

Global Self-Esteem
\[ \text{gnsel}_{pq} \sim N(\lambda_{B}, \Omega) \]
\[ \text{gnsel}_{pq} = \beta_{\text{gnsel}, \text{cons}} \]
\[ \beta_{\text{gnsel}, \text{cons}} = -0.076(0.061) + \nu_{\text{gnsel}, \text{cons}} + \epsilon_{\text{gnsel}, \text{cons}} \]
\[ \nu_{\text{gnsel}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.041(0.036) \end{bmatrix} \]
\[ \nu_{\text{gnsel}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.976(0.084) \end{bmatrix} \]
\[ \nu_{\text{gnsel}, \text{cons}} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.280(0.023) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 1935.380(727 \text{ of } 1860 \text{ cases in use}) \]

479
**ROPE**

**Self-Confidence**

\[ \text{slfcon}_i \sim N(X_i, \Omega) \]

\[ \text{slfcon}_i = \beta_{\text{slfcon}} + u_{\text{slfcon}} + e_{\text{slfcon}} \]

\[
\begin{bmatrix}
v_{\text{slfcon}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.056(0.037) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{slfcon}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.847(0.080) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{slfcon}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.366(0.029) \end{bmatrix}
\]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 2024.135(731 of 1860 cases in use)\]

**Self-Efficacy**

\[ \text{slftec}_i \sim N(X_i, \Omega) \]

\[ \text{slftec}_i = \beta_{\text{slftec}} + u_{\text{slftec}} + e_{\text{slftec}} \]

\[
\begin{bmatrix}
v_{\text{slftec}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.032(0.029) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{slftec}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.637(0.072) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{slftec}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.496(0.039) \end{bmatrix}
\]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 2059.576(731 of 1860 cases in use)\]

**Stress Management**

\[ \text{strmsg}_i \sim N(X_i, \Omega) \]

\[ \text{strmsg}_i = \beta_{\text{strmsg}} + u_{\text{strmsg}} + e_{\text{strmsg}} \]

\[
\begin{bmatrix}
v_{\text{strmsg}}
\end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.020(0.022) \end{bmatrix}
\]

\[
\begin{bmatrix}
u_{\text{strmsg}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.691(0.074) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{\text{strmsg}}
\end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.468(0.037) \end{bmatrix}
\]

\[-2^*\text{loglikelihood(IGLS Deviance)} = 2052.544(731 of 1860 cases in use)\]
Open Thinking
\[ \text{opentnk}_{\text{eq}} \sim N(XB, \Omega) \]
\[ \text{opentnk}_{\text{eq}} = \beta_{\text{eq cons}} \]
\[ \beta_{\text{eq}} = -0.015(0.057) + \nu_{\text{eq}} + u_{\text{eq}} + e_{\text{eq}} \]
\[ \begin{bmatrix} \nu_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.039(0.022) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.790(0.075) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.342(0.027) \end{bmatrix} \]
\[-2\text{loglikelihoodIGLS Deviance} = 1969.541(731 of 1860 cases in use)\]

Social Effectiveness
\[ \text{social}_{\text{eq}} \sim N(XB, \Omega) \]
\[ \text{social}_{\text{eq}} = \beta_{\text{eq cons}} \]
\[ \beta_{\text{eq}} = 0.004(0.032) + \nu_{\text{eq}} + u_{\text{eq}} + e_{\text{eq}} \]
\[ \begin{bmatrix} \nu_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.012(0.027) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.825(0.077) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.332(0.026) \end{bmatrix} \]
\[-2\text{loglikelihoodIGLS Deviance} = 1964.605(731 of 1860 cases in use)\]

Cooperative Teamwork
\[ \text{coteam}_{\text{eq}} \sim N(XB, \Omega) \]
\[ \text{coteam}_{\text{eq}} = \beta_{\text{eq cons}} \]
\[ \beta_{\text{eq}} = -0.142(0.056) + \nu_{\text{eq}} + u_{\text{eq}} + e_{\text{eq}} \]
\[ \begin{bmatrix} \nu_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.051(0.031) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.841(0.078) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{eq}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.521(0.026) \end{bmatrix} \]
\[-2\text{loglikelihoodIGLS Deviance} = 1969.676(731 of 1860 cases in use)\]
Leadership Ability
lead_{qk} \sim N(XB, \Omega)
lead_{qk} = \beta_{qk} + \epsilon_{qk} + \eta_{qk}

[\gamma_{qk}] \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.000(0.000) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.652(0.067) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.446(0.036) \end{bmatrix}

-2*log(likelihood) (IGLS Deviance) = 2006.568 (731 of 1860 cases in use)

Time Efficiency
tmeef_{qk} \sim N(XB, \Omega)
tmeef_{qk} = \beta_{qk} + \epsilon_{qk} + \eta_{qk}

[\gamma_{qk}] \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.039(0.029) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.638(0.068) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.426(0.034) \end{bmatrix}

-2*log(likelihood) (IGLS Deviance) = 1995.644 (731 of 1860 cases in use)

Quality Seeking
qlysk_{qk} \sim N(XB, \Omega)
qlysk_{qk} = \beta_{qk} + \epsilon_{qk} + \eta_{qk}

[\gamma_{qk}] \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.024(0.022) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.856(0.085) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.451(0.056) \end{bmatrix}

-2*log(likelihood) (IGLS Deviance) = 2102.617 (731 of 1860 cases in use)
Coping with Change
cprechgk \sim N(X\beta, \Omega)
cprechgk = \beta_{cpreh} \times \text{cons}

\[\beta_{cpreh} = -0.076(0.064) + \gamma_{gk} + u_{gk} + e_{gk}\]

\[\gamma_{gk} \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.075(0.040) \end{bmatrix}\]

\[u_{gk} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.784(0.078) \end{bmatrix}\]

\[e_{gk} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.405(0.032) \end{bmatrix}\]

\[-2*\text{loglikelihood} (IGLS Deviance) = 2045.957 (731 of 1860 cases in use)\]

Active Involvement

activepgk \sim N(X\beta, \Omega)

activepgk = \beta_{active} \times \text{cons}

\[\beta_{active} = -0.139(0.054) + \gamma_{gk} + u_{gk} + e_{gk}\]

\[\gamma_{gk} \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.015(0.029) \end{bmatrix}\]

\[u_{gk} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.847(0.081) \end{bmatrix}\]

\[e_{gk} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.382(0.031) \end{bmatrix}\]

\[-2*\text{loglikelihood} (IGLS Deviance) = 2029.662 (731 of 1860 cases in use)\]

Overall Effectiveness

overefpgk \sim N(X\beta, \Omega)

overefpgk = \beta_{overe} \times \text{cons}

\[\beta_{overe} = -0.038(0.054) + \gamma_{gk} + u_{gk} + e_{gk}\]

\[\gamma_{gk} \sim N(0, \Omega_\gamma) : \Omega_\gamma = \begin{bmatrix} 0.010(0.029) \end{bmatrix}\]

\[u_{gk} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.858(0.084) \end{bmatrix}\]

\[e_{gk} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.451(0.034) \end{bmatrix}\]

\[-2*\text{loglikelihood} (IGLS Deviance) = 2080.563 (731 of 1860 cases in use)\]
CSI

Problem Solving

\( \text{prsolv}_{pk} \sim N(\lambda X, \Omega) \)

\( \text{prsolv}_{pk} = \beta_{0pk} + \epsilon_{0pk} \)

\( \beta_{0pk} = 0.053(0.050) + \nu_{pk} + u_{0pk} + \epsilon_{0pk} \)

\[ \begin{bmatrix} \nu_{pk} \\ u_{0pk} \end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.008(0.025) \\ 0.711(0.074) \end{bmatrix} \]

\[ \begin{bmatrix} \theta_{0pk} \end{bmatrix} \sim N(0, \Omega_{r}) : \Omega_{r} = \begin{bmatrix} 0.379(0.032) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 1837.233(679 of 1860 cases in use)\)

Seeking Support

\( \text{supsepk}_{pk} \sim N(\lambda X, \Omega) \)

\( \text{supsepk}_{pk} = \beta_{0pk} + \epsilon_{0pk} \)

\( \beta_{0pk} = 0.027(0.045) + \nu_{pk} + u_{0pk} + \epsilon_{0pk} \)

\[ \begin{bmatrix} \nu_{pk} \end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.000(0.020) \end{bmatrix} \]

\[ \begin{bmatrix} \theta_{0pk} \end{bmatrix} \sim N(0, \Omega_{r}) : \Omega_{r} = \begin{bmatrix} 0.550(0.063) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 1748.318(678 of 1860 cases in use)\)

Avoidance

\( \text{avoid}_{pk} \sim N(\lambda X, \Omega) \)

\( \text{avoid}_{pk} = \beta_{0pk} + \epsilon_{0pk} \)

\( \beta_{0pk} = -0.173(0.053) + \nu_{pk} + u_{0pk} + \epsilon_{0pk} \)

\[ \begin{bmatrix} \nu_{pk} \end{bmatrix} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.020(0.025) \end{bmatrix} \]

\[ \begin{bmatrix} \theta_{0pk} \end{bmatrix} \sim N(0, \Omega_{r}) : \Omega_{r} = \begin{bmatrix} 0.617(0.065) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 1771.698(679 of 1860 cases in use)\)
Bullying Attitude Scale

Pro-Bully
probbly_{qk} \sim N(\lambda B, \Omega)
probbly_{qk} = \beta_{qk}\text{cons}

\beta_{qk} = -0.066(0.050) + v_{qk} + u_{qk} + \epsilon_{qk}

[v_{qk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.002(0.025) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.674(0.076) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.445(0.038) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 1834.915 (663 of 1860 cases in use)

Pro-Victim
provcvt_{qk} \sim N(\lambda V, \Omega)
provcvt_{qk} = \beta_{qk}\text{cons}

\beta_{qk} = 0.001(0.046) + v_{qk} + u_{qk} + \epsilon_{qk}

[v_{qk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.011(0.021) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.435(0.061) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.491(0.042) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 1768.108 (663 of 1860 cases in use)

Support Scales

Parent Support
parsupp_{qk} \sim N(\lambda B, \Omega)
parsupp_{qk} = \beta_{qk}\text{cons}

\beta_{qk} = -0.055(0.068) + v_{qk} + u_{qk} + \epsilon_{qk}

[v_{qk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.056(0.045) \end{bmatrix}

[u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 1.126(0.103) \end{bmatrix}

[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.410(0.033) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2131.458 (720 of 1860 cases in use)
Peer Support
\[ \text{persupp}_{jk} \sim N(XB, \Omega) \]
\[ \text{persupp}_{jk} = \beta_{0jk} + \epsilon_{pjk} \]
\[ \beta_{0jk} = 0.068(0.050) + v_{0jk} + u_{0jk} + \epsilon_{0jk} \]

\[ \begin{bmatrix} v_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.723(0.075) \end{bmatrix} \]

\[ \begin{bmatrix} \epsilon_{0jk} \end{bmatrix} \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.492(0.040) \end{bmatrix} \]

\(-2*\text{loglikelihood(IGLS Deviance)} = 2044.212(718 of 1860 cases in use)\)

Enjoyment of School Scale
\[ \text{enjsch}_{jk} \sim N(XB, \Omega) \]
\[ \text{enjsch}_{jk} = \beta_{0jk} + \epsilon_{pjk} \]
\[ \beta_{0jk} = -0.137(0.059) + v_{0jk} + u_{0jk} + \epsilon_{0jk} \]

\[ \begin{bmatrix} v_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.043(0.034) \end{bmatrix} \]

\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.854(0.080) \end{bmatrix} \]

\[ \begin{bmatrix} \epsilon_{0jk} \end{bmatrix} \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.521(0.025) \end{bmatrix} \]

\(-2*\text{loglikelihood(IGLS Deviance)} = 1998.202(737 of 1860 cases in use)\)
### APPENDIX G-1

**RAW SCORE MEANS FOR YEAR 10/11 EXPERIMENTAL AND CONTROL GROUPS AT TIME1, TIME2 AND TIME3 (N = 858)**

<table>
<thead>
<tr>
<th>SDQ II-S</th>
<th>Experimental Group</th>
<th>Control Group 1</th>
<th>Control Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
</tr>
<tr>
<td>Physical Abilities</td>
<td>M 4.79</td>
<td>4.75</td>
<td>4.74</td>
</tr>
<tr>
<td></td>
<td>SD 1.06</td>
<td>1.12</td>
<td>1.10</td>
</tr>
<tr>
<td>Physical Appearance</td>
<td>M 4.15</td>
<td>4.56</td>
<td>4.47</td>
</tr>
<tr>
<td></td>
<td>SD 1.20</td>
<td>1.23</td>
<td>1.11</td>
</tr>
<tr>
<td>Same-Sex Relations</td>
<td>M 5.28</td>
<td>5.16</td>
<td>5.20</td>
</tr>
<tr>
<td></td>
<td>SD 0.70</td>
<td>0.73</td>
<td>0.78</td>
</tr>
<tr>
<td>Opposite-Sex Relations</td>
<td>M 4.91</td>
<td>5.01</td>
<td>4.98</td>
</tr>
<tr>
<td></td>
<td>SD 0.89</td>
<td>0.88</td>
<td>0.82</td>
</tr>
<tr>
<td>Honesty/Trustworthiness</td>
<td>M 4.82</td>
<td>4.98</td>
<td>4.94</td>
</tr>
<tr>
<td></td>
<td>SD 0.79</td>
<td>0.76</td>
<td>0.86</td>
</tr>
<tr>
<td>Parent Relationships</td>
<td>M 5.11</td>
<td>5.01</td>
<td>4.96</td>
</tr>
<tr>
<td></td>
<td>SD 0.90</td>
<td>1.03</td>
<td>1.00</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>M 4.03</td>
<td>3.89</td>
<td>3.84</td>
</tr>
<tr>
<td></td>
<td>SD 1.07</td>
<td>1.19</td>
<td>1.16</td>
</tr>
<tr>
<td>Verbal</td>
<td>M 4.14</td>
<td>4.19</td>
<td>4.29</td>
</tr>
<tr>
<td></td>
<td>SD 1.20</td>
<td>1.30</td>
<td>1.17</td>
</tr>
<tr>
<td>Math</td>
<td>M 4.27</td>
<td>3.99</td>
<td>4.19</td>
</tr>
<tr>
<td></td>
<td>SD 1.31</td>
<td>1.53</td>
<td>1.29</td>
</tr>
<tr>
<td>School</td>
<td>M 4.90</td>
<td>4.84</td>
<td>4.87</td>
</tr>
<tr>
<td></td>
<td>SD 0.88</td>
<td>0.96</td>
<td>0.88</td>
</tr>
<tr>
<td>Global Self</td>
<td>M 5.08</td>
<td>5.12</td>
<td>5.08</td>
</tr>
<tr>
<td></td>
<td>SD 0.64</td>
<td>0.69</td>
<td>0.70</td>
</tr>
</tbody>
</table>

**ROPE**

<table>
<thead>
<tr>
<th></th>
<th>Experimental Group</th>
<th>Control Group 1</th>
<th>Control Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>M 6.79</td>
<td>6.79</td>
<td>6.74</td>
</tr>
<tr>
<td></td>
<td>SD 1.04</td>
<td>1.03</td>
<td>1.09</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>M 5.62</td>
<td>5.77</td>
<td>5.84</td>
</tr>
<tr>
<td></td>
<td>SD 1.36</td>
<td>1.19</td>
<td>1.12</td>
</tr>
<tr>
<td>Stress Management</td>
<td>M 5.76</td>
<td>5.63</td>
<td>5.62</td>
</tr>
<tr>
<td></td>
<td>SD 1.36</td>
<td>1.45</td>
<td>1.32</td>
</tr>
<tr>
<td>Open Thinking</td>
<td>M 6.71</td>
<td>6.67</td>
<td>6.54</td>
</tr>
<tr>
<td></td>
<td>SD 1.02</td>
<td>0.89</td>
<td>0.88</td>
</tr>
<tr>
<td>Social Efficacy</td>
<td>M 6.67</td>
<td>6.61</td>
<td>6.59</td>
</tr>
<tr>
<td></td>
<td>SD 1.14</td>
<td>1.01</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Experimental Group</td>
<td>Control Group 1</td>
<td>Control Group 2</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
</tr>
<tr>
<td>Cooperative Teamwork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 6.76</td>
<td>6.60</td>
<td>6.61</td>
<td>6.30</td>
</tr>
<tr>
<td>SD 1.34</td>
<td>1.17</td>
<td>1.06</td>
<td>1.38</td>
</tr>
<tr>
<td>Leadership Ability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 6.82</td>
<td>6.83</td>
<td>6.67</td>
<td>6.04</td>
</tr>
<tr>
<td>SD 1.23</td>
<td>0.95</td>
<td>0.99</td>
<td>1.63</td>
</tr>
<tr>
<td>Time Efficacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 5.62</td>
<td>5.50</td>
<td>5.77</td>
<td>5.25</td>
</tr>
<tr>
<td>SD 1.39</td>
<td>1.39</td>
<td>1.23</td>
<td>1.51</td>
</tr>
<tr>
<td>Quality Seeking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD 1.06</td>
<td>1.02</td>
<td>1.07</td>
<td>1.16</td>
</tr>
<tr>
<td>Coping with Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 6.23</td>
<td>6.02</td>
<td>6.11</td>
<td>5.75</td>
</tr>
<tr>
<td>SD 1.24</td>
<td>1.22</td>
<td>1.16</td>
<td>1.45</td>
</tr>
<tr>
<td>Active Involvement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD 1.01</td>
<td>0.94</td>
<td>1.09</td>
<td>1.31</td>
</tr>
<tr>
<td>Overall Effectiveness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M 6.35</td>
<td>5.92</td>
<td>6.42</td>
<td>5.85</td>
</tr>
<tr>
<td>SD 1.05</td>
<td>1.35</td>
<td>1.00</td>
<td>1.38</td>
</tr>
<tr>
<td>CSI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>M 4.04</td>
<td>3.93</td>
<td>4.01</td>
</tr>
<tr>
<td>SD 1.04</td>
<td>1.04</td>
<td>1.09</td>
<td>1.04</td>
</tr>
<tr>
<td>Seeks Social Support</td>
<td>M 4.31</td>
<td>4.29</td>
<td>4.30</td>
</tr>
<tr>
<td>SD 1.22</td>
<td>1.20</td>
<td>1.03</td>
<td>1.31</td>
</tr>
<tr>
<td>Avoidance</td>
<td>M 2.40</td>
<td>2.58</td>
<td>2.56</td>
</tr>
<tr>
<td>SD 0.94</td>
<td>1.08</td>
<td>1.03</td>
<td>1.00</td>
</tr>
<tr>
<td>APRI-A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pro-Bully</td>
<td>M 2.06</td>
<td>2.06</td>
<td>2.09</td>
</tr>
<tr>
<td>SD 0.81</td>
<td>0.83</td>
<td>0.78</td>
<td>0.92</td>
</tr>
<tr>
<td>Pro-Victim</td>
<td>M 5.08</td>
<td>4.90</td>
<td>4.87</td>
</tr>
<tr>
<td>SD 0.73</td>
<td>0.90</td>
<td>0.90</td>
<td>0.93</td>
</tr>
<tr>
<td>Support Scales</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent Support</td>
<td>M 5.42</td>
<td>5.25</td>
<td>5.21</td>
</tr>
<tr>
<td>SD 0.71</td>
<td>0.90</td>
<td>1.01</td>
<td>1.03</td>
</tr>
<tr>
<td>Peer Support</td>
<td>M 4.92</td>
<td>4.99</td>
<td>4.89</td>
</tr>
<tr>
<td>SD 0.93</td>
<td>0.78</td>
<td>0.94</td>
<td>1.09</td>
</tr>
<tr>
<td>School Enjoyment Scale</td>
<td>M 5.84</td>
<td>5.61</td>
<td>5.68</td>
</tr>
<tr>
<td>SD 1.44</td>
<td>1.48</td>
<td>1.52</td>
<td>1.55</td>
</tr>
</tbody>
</table>
APPENDIX G-2
MULTILEVEL MODELS FOR YEAR 10/11 STUDENTS

In Study 3, three key models were used to compare the scale scores of students in the experimental group with those in the control groups. Model 1a is the baseline variance components model, which indicates how much of the total variance was partitioned into variance components associated with school, individual and time. Model 1b indicates how much of the variance in school and individual student scores could be explained in terms of the T1 variable. Model 2a tests contrast set 1, Model 2b tests contrast set 2, and Model 2c tests contrast set 3. Model 4 was designed to test for the presence of aptitude-treatment interaction effects. In each of the models: $XB =$ fixed part of the model; $\Omega =$ covariance matrix; $\beta_{0ijk} =$ intercept; $v_{0k} =$ random school effect; $u_{0jk} =$ random student effect; and $e_{ijk} =$ random time effect.

SDQH-S
Physical Ability: Model 1
\[
\text{phyabl}_{jk} \sim N(XB, \Omega)
\]
\[
\text{phyabl}_{jk} = \beta_{0jk} + \varepsilon_{0jk}
\]
\[
\beta_{0jk} = -0.035(0.058) + v_{0k} + u_{0k} + e_{0jk}
\]
\[
\begin{bmatrix}
v_{0k} \\
u_{0k} \\
e_{0jk}
\end{bmatrix}
\sim N\left(0, \Omega_{v}\right), \quad \Omega_{v} = \begin{bmatrix}
0.000(0.003) \\
0.758(0.051) \\
0.270(0.019)
\end{bmatrix}
\]

$-2\times\text{loglikelihood(IGLS Deviance)} = 2942.729 (1141 of 1716 cases in use)$

Physical Ability: Model 1b
\[
\text{phyabl}_{jk} \sim N(XB, \Omega)
\]
\[
\text{phyabl}_{jk} = \beta_{0jk} + \varepsilon_{0jk}
\]
\[
\beta_{0jk} = -0.035(0.026) + v_{0k} + u_{0k} + e_{0jk}
\]
\[
\begin{bmatrix}
v_{0k} \\
u_{0k} \\
e_{0jk}
\end{bmatrix}
\sim N\left(0, \Omega_{v}\right), \quad \Omega_{v} = \begin{bmatrix}
0.000(0.000) \\
0.241(0.021) \\
0.277(0.020)
\end{bmatrix}
\]

$-2\times\text{loglikelihood(IGLS Deviance)} = 2040.133 (977 of 1716 cases in use)$
Physical Ability: Model 2a

\[
\text{phyabla}_{qk} \sim N(\lambda_{qk}, \Omega)
\]

\[
\begin{align*}
\beta_{qk} &= \beta_{qk} + \text{cons} + 0.705(0.026) \times \text{phyabla}_{qk} + 0.013(0.020) \times \text{time}_{qk} + 0.023(0.025) \times \text{expvs.c1.c2}_{qk} + \\
&-0.044(0.029) \times \text{v1s2.c2}_{qk} + 0.010(0.017) \times \text{expvs.c1c2.time}_{qk} + 0.007(0.020) \times \text{v1s2.c2.time}_{qk}
\end{align*}
\]

\[
\begin{align*}
\beta_{qk} &= -0.032(0.030) + v_{qk} + u_{qk} + e_{qk}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\nu_{qk}
\end{array}\right] &\sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix}
0.000(0.000)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\mu_{qk}
\end{array}\right] &\sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix}
0.239(0.027)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
e_{qk}
\end{array}\right] &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix}
0.276(0.020)
\end{bmatrix}
\end{align*}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 2035.466(977 of 1716 cases in use)\]

Physical Ability: Model 2b

\[
\text{phyabla}_{qk} \sim N(\lambda_{qk}, \Omega)
\]

\[
\begin{align*}
\beta_{qk} &= \beta_{qk} + \text{cons} + 0.705(0.026) \times \text{phyabla}_{qk} + 0.013(0.020) \times \text{time}_{qk} + 0.010(0.019) \times \text{expvs.c2vs.c1}_{qk} + \\
&-0.037(0.042) \times \text{expvs.c2vs.c1.c2}_{qk} + 0.008(0.033) \times \text{expvs.c1c2.time}_{qk} + 0.012(0.028) \times \text{expvs.c2.time}_{qk}
\end{align*}
\]

\[
\begin{align*}
\beta_{qk} &= -0.032(0.030) + v_{qk} + u_{qk} + e_{qk}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\nu_{qk}
\end{array}\right] &\sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix}
0.000(0.000)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\mu_{qk}
\end{array}\right] &\sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix}
0.239(0.027)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
e_{qk}
\end{array}\right] &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix}
0.276(0.020)
\end{bmatrix}
\end{align*}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 2035.466(977 of 1716 cases in use)\]

Physical Ability: Model 2c

\[
\text{phyabla}_{qk} \sim N(\lambda_{qk}, \Omega)
\]

\[
\begin{align*}
\beta_{qk} &= \beta_{qk} + \text{cons} + 0.705(0.026) \times \text{phyabla}_{qk} + 0.013(0.020) \times \text{time}_{qk} + 0.023(0.025) \times \text{c2vs.c1exp}_{qk} - \\
&0.034(0.020) \times \text{expvs.c1}_{qk} + 0.012(0.021) \times \text{c2vs.c1exp.time}_{qk} + 0.019(0.026) \times \text{expvs.c1.time}_{qk}
\end{align*}
\]

\[
\begin{align*}
\beta_{qk} &= -0.032(0.030) + v_{qk} + u_{qk} + e_{qk}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\nu_{qk}
\end{array}\right] &\sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix}
0.000(0.000)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
\mu_{qk}
\end{array}\right] &\sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix}
0.239(0.027)
\end{bmatrix}
\end{align*}
\]

\[
\begin{align*}
\left[\begin{array}{c}
e_{qk}
\end{array}\right] &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix}
0.276(0.020)
\end{bmatrix}
\end{align*}
\]

\[-2\text{loglikelihood}(IGLS Deviance) = 2035.466(977 of 1716 cases in use)\]
Physical Ability: Model 3

\[ \text{phyabl}_{ik} \sim N(X_{ik}, \Omega) \]

\[ \text{phyabl}_{ik} = \beta_{\text{phyabl}} + 0.719(0.012) \text{h1phyabl}_{ik} + 0.019(0.025) \text{expvs.c1c2}_{ik} + 0.046(0.029) \text{c1vs.c2}_{ik} + 
-0.019(0.018) \text{time}_{ik} + 0.026(0.027) \text{h1phyabl}.\text{expvs.c1c2}_{ik} + 0.006(0.025) \text{h1phyabl}.\text{c1vs.c2}_{ik} + 
-0.018(0.021) \text{h1phyabl}.\text{time}_{ik} - 0.001(0.018) \text{h1phyabl}.\text{expvs.c1c2}.\text{time}_{ik} \]

\[ \beta_{\text{phyabl}} = -0.036(0.031) + v_{ik} + u_{ik} + e_{ik} \]

\[ [v_{ik}] \sim N(0, \Sigma_v) : \Sigma_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ [u_{ik}] \sim N(0, \Sigma_u) : \Sigma_u = \begin{bmatrix} 0.240(0.027) \end{bmatrix} \]

\[ [e_{ik}] \sim N(0, \Sigma_e) : \Sigma_e = \begin{bmatrix} 0.274(0.020) \end{bmatrix} \]

\(-2*\text{loglikelihood}_\text{IGLS Deviance} = 2033.963\) (977 of 1716 cases in use)

Physical Appearance: Model 1

\[ \text{appear}_{ik} \sim N(X_{ik}, \Omega) \]

\[ \text{appear}_{ik} = \beta_{\text{appear}} + 0.123(0.095) \text{h1appear}_{ik} + v_{ik} + u_{ik} + e_{ik} \]

\[ [v_{ik}] \sim N(0, \Sigma_v) : \Sigma_v = \begin{bmatrix} 0.022(0.022) \end{bmatrix} \]

\[ [u_{ik}] \sim N(0, \Sigma_u) : \Sigma_u = \begin{bmatrix} 0.010(0.052) \end{bmatrix} \]

\[ [e_{ik}] \sim N(0, \Sigma_e) : \Sigma_e = \begin{bmatrix} 0.345(0.024) \end{bmatrix} \]

\(-2*\text{loglikelihood}_\text{IGLS Deviance} = 3032.963\) (1133 of 1716 cases in use)

Physical Appearance: Model 1b

\[ \text{appear}_{ik} \sim N(X_{ik}, \Omega) \]

\[ \text{appear}_{ik} = \beta_{\text{appear}} + 0.058(0.050) \text{h1appear}_{ik} + v_{ik} + u_{ik} + e_{ik} \]

\[ [v_{ik}] \sim N(0, \Sigma_v) : \Sigma_v = \begin{bmatrix} 0.006(0.000) \end{bmatrix} \]

\[ [u_{ik}] \sim N(0, \Sigma_u) : \Sigma_u = \begin{bmatrix} 0.247(0.034) \end{bmatrix} \]

\[ [e_{ik}] \sim N(0, \Sigma_e) : \Sigma_e = \begin{bmatrix} 0.287(0.021) \end{bmatrix} \]

\(-2*\text{loglikelihood}_\text{IGLS Deviance} = 2179.791\) (969 of 1716 cases in use)
Physical Appearance: Model 2a
appear_{pk} \sim N(X_{pk}, \Omega)

appear_{pk} = \beta_{pk}cons + 0.655(0.030) \times \text{time}_{pk} + 0.025(0.021) \times \text{exp}v_{pk} + 0.064(0.029) \times \text{c1c2}_{pk} +
-0.012(0.033) \times \text{c1vs.c2}_{pk} - 0.0126(0.017) \times \text{exp}v_{pk} \times \text{c1c2}_{pk} + 0.006(0.020) \times \text{c1vs.c2} \times \text{time}_{pk}

\beta_{pk} = 0.180(0.034) + v_{pk} + u_{pk} + e_{pk}

\mathbb{E}[v_{pk}] = [0.000(0.000)]
\mathbb{E}[u_{pk}] = [0.348(0.033)]
\mathbb{E}[e_{pk}] = [0.280(0.021)]

-2*\text{loglikelihood(GLS Deviance)} = 2167.656(969 of 1716 cases in use)

Physical Appearance: Model 2b
appear_{pk} \sim N(X_{pk}, \Omega)

appear_{pk} = \beta_{pk}cons + 0.655(0.030) \times \text{time}_{pk} + 0.025(0.021) \times \text{exp}v_{pk} + 0.064(0.029) \times \text{c1c2}_{pk} +
-0.012(0.033) \times \text{exp}v_{pk} \times \text{c1c2}_{pk} - 0.0126(0.017) \times \text{exp}v_{pk} \times \text{c1vs.c2} + 0.006(0.020) \times \text{exp}v_{pk} \times \text{c1vs.c2} \times \text{time}_{pk}

\beta_{pk} = 0.180(0.034) + v_{pk} + u_{pk} + e_{pk}

\mathbb{E}[v_{pk}] = [0.000(0.000)]
\mathbb{E}[u_{pk}] = [0.348(0.033)]
\mathbb{E}[e_{pk}] = [0.280(0.021)]

-2*\text{loglikelihood(GLS Deviance)} = 2167.656(969 of 1716 cases in use)

Physical Appearance: Model 2c
appear_{pk} \sim N(X_{pk}, \Omega)

appear_{pk} = \beta_{pk}cons + 0.655(0.030) \times \text{time}_{pk} + 0.025(0.021) \times \text{exp}v_{pk} + 0.064(0.029) \times \text{c1c2}_{pk} +
-0.012(0.033) \times \text{exp}v_{pk} \times \text{c1c2}_{pk} - 0.0126(0.017) \times \text{exp}v_{pk} \times \text{c1vs.c2} + 0.006(0.020) \times \text{exp}v_{pk} \times \text{c1vs.c2} \times \text{time}_{pk}

\beta_{pk} = 0.180(0.034) + v_{pk} + u_{pk} + e_{pk}

\mathbb{E}[v_{pk}] = [0.000(0.000)]
\mathbb{E}[u_{pk}] = [0.348(0.033)]
\mathbb{E}[e_{pk}] = [0.280(0.021)]

-2*\text{loglikelihood(GLS Deviance)} = 2167.656(969 of 1716 cases in use)
Physical Appearance: Model 3
appear_{qk} \sim N(\bar{X}_c, \Omega)

appear_{qk} = \beta_{0qk} + \beta_{1qk} \times \text{time}_{qk} + \beta_{2qk} \times \expvs_{c1} + \beta_{3qk} \times \expvs_{c2} + \beta_{4qk} \times \text{clvs}_{c1} + \beta_{5qk} \times \text{clvs}_{c2} + \epsilon_{qk}

\beta_{0qk} = 0.182(0.034) + v_{0q} + u_{0qk} + \epsilon_{0qk}

\begin{bmatrix} v_{0k} \\ u_{0qk} \\ e_{0qk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \\ 0.348(0.033) \\ 0.278(0.021) \end{bmatrix}

-2\times\text{loglikelihood(IGLS Deviance)} = 2163.501 (969 of 1716 cases in use)

Same-Sex Relations: Model 1
smess_{qk} \sim N(\bar{X}_c, \Omega)

smess_{qk} = \beta_{0qk} + \beta_{1qk} \times \text{time}_{qk} + v_{qk} + \epsilon_{qk}

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.001(0.004) \\ 0.687(0.056) \\ 0.499(0.024) \end{bmatrix}

-2\times\text{loglikelihood(IGLS Deviance)} = 3262.043 (1141 of 1716 cases in use)

Same-Sex Relations: Model 1b
smess_{qk} \sim N(\bar{X}_c, \Omega)

smess_{qk} = \beta_{0qk} + \beta_{1qk} \times \text{time}_{qk} + v_{qk} + \epsilon_{qk}

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \\ 0.463(0.045) \\ 0.455(0.023) \end{bmatrix}

-2\times\text{loglikelihood(IGLS Deviance)} = 2582.583 (977 of 1716 cases in use)
Same-Sex Relations: Model 2a

\[ \text{smesx}_{\text{ge}} \sim N(\Omega) \]

\[ \text{smesx}_{\text{ge}} = \beta_{\text{ge}} + \text{cons} + 0.476(0.035) \times \text{smesx}_{\text{ge}} + 0.015(0.026) \times \text{time}_{\text{ge}} + 0.085(0.034) \times \text{expvs.c1c2}_{\text{ge}} + 0.009(0.039) \times \text{clvs.c2}_{\text{ge}} + 0.021(0.022) \times \text{expvs.c1c2.time}_{\text{ge}} + 0.027(0.026) \times \text{clvs.c2.time}_{\text{ge}} \]

\[ \beta_{\text{ge}} = -0.164(0.041) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [\nu_{\text{ge}}] \sim N(0, \Omega_v) : \Omega_v = [0.000(0.000)] \]

\[ [u_{\text{ge}}] \sim N(0, \Omega_u) : \Omega_u = [0.454(0.048)] \]

\[ [e_{\text{ge}}] \sim N(0, \Omega_e) : \Omega_e = [0.453(0.033)] \]

-2*loglikelihood(IGLS Deviance) = 2572.808 (977 of 1716 cases in use)

Same-Sex Relations: Model 2b

\[ \text{smesx}_{\text{ge}} \sim N(\Omega) \]

\[ \text{smesx}_{\text{ge}} = \beta_{\text{ge}} + \text{cons} + 0.476(0.035) \times \text{smesx}_{\text{ge}} + 0.015(0.026) \times \text{time}_{\text{ge}} + 0.047(0.025) \times \text{expc2vs.c1p}_{\text{ge}} + 0.122(0.056) \times \text{expvs.c1c2}_{\text{ge}} + 0.024(0.016) \times \text{expc2vs.c1.time}_{\text{ge}} + 0.018(0.036) \times \text{expvs.c2.time}_{\text{ge}} \]

\[ \beta_{\text{ge}} = -0.164(0.041) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [\nu_{\text{ge}}] \sim N(0, \Omega_v) : \Omega_v = [0.000(0.000)] \]

\[ [u_{\text{ge}}] \sim N(0, \Omega_u) : \Omega_u = [0.454(0.048)] \]

\[ [e_{\text{ge}}] \sim N(0, \Omega_e) : \Omega_e = [0.453(0.033)] \]

-2*loglikelihood(IGLS Deviance) = 2572.808 (977 of 1716 cases in use)

Same-Sex Relations: Model 2c

\[ \text{smesx}_{\text{ge}} \sim N(\Omega) \]

\[ \text{smesx}_{\text{ge}} = \beta_{\text{ge}} + \text{cons} + 0.476(0.035) \times \text{smesx}_{\text{ge}} + 0.015(0.026) \times \text{time}_{\text{ge}} + 0.038(0.027) \times \text{clvs.c1exp}_{\text{ge}} + 0.122(0.056) \times \text{expvs.c1c2}_{\text{ge}} + 0.009(0.039) \times \text{clvs.c1.expvs.c1.time}_{\text{ge}} + 0.045(0.024) \times \text{expvs.c1.time}_{\text{ge}} \]

\[ \beta_{\text{ge}} = -0.164(0.041) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [\nu_{\text{ge}}] \sim N(0, \Omega_v) : \Omega_v = [0.000(0.000)] \]

\[ [u_{\text{ge}}] \sim N(0, \Omega_u) : \Omega_u = [0.454(0.048)] \]

\[ [e_{\text{ge}}] \sim N(0, \Omega_e) : \Omega_e = [0.453(0.033)] \]

-2*loglikelihood(IGLS Deviance) = 2572.808 (977 of 1716 cases in use)
Same-Sex Relations: Model 3
\[ \text{smesx}_{gk} \sim N(\mu_{gk}, \Omega) \]
\[ \text{smesx}_{gk} = \beta_{0gk} + \beta_{1gk}\text{cons} + 0.474(0.045)\text{t} \text{smesx}_{gk} + 0.081(0.034)\text{expvs.c1c2}_{gk} - 0.003(0.005)\text{clvs.c2}_{gk} + 
- 0.032(0.023)\text{time}_{g} + 0.012(0.040)\text{t} \text{smesx .expvs.c1c2}_{gk} - 0.098(0.037)\text{t} \text{smesx .clvs.c2}_{gk} + 
0.005(0.025)\text{t} \text{smesx.time}_{g} + 0.022(0.024)\text{t} \text{smesx .expvs.c1c2.time}_{g} + 
0.021(0.025)\text{t} \text{smesx .clvs.c2 .time}_{g} \]
\[ \beta_{0gk} = -0.169(0.041) + v_{0gk} + u_{0gk} + \epsilon_{0gk} \]
\[ [v_{0gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{0gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.446(0.047) \end{bmatrix} \]
\[ [\epsilon_{0gk}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.452(0.033) \end{bmatrix} \]
\[-2^{*}\text{loglikelihood (IGLS Deviance)} = 2565.117(977 of 1716 cases in use)\]

Opposite-Sex Relations: Model 1
\[ \text{oppsx}_{gk} \sim N(\mu_{gk}, \Omega) \]
\[ \text{oppsx}_{gk} = \beta_{0gk} + \beta_{1gk}\text{cons} \]
\[ \beta_{0gk} = -0.028(0.036) + v_{0gk} + u_{0gk} + \epsilon_{0gk} \]
\[ [v_{0gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{0gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.658(0.053) \end{bmatrix} \]
\[ [\epsilon_{0gk}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.430(0.030) \end{bmatrix} \]
\[-2^{*}\text{loglikelihood (IGLS Deviance)} = 3144.396(1141 of 1716 cases in use)\]

Opposite-Sex Relations: Model 1b
\[ \text{oppsx}_{gk} \sim N(\mu_{gk}, \Omega) \]
\[ \text{oppsx}_{gk} = \beta_{0gk} + \beta_{1gk}\text{cons} + 0.613(0.030)\text{t} \text{oppsx}_{gk} \]
\[ \beta_{0gk} = -0.036(0.021) + v_{0gk} + u_{0gk} + \epsilon_{0gk} \]
\[ [v_{0gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{0gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.312(0.037) \end{bmatrix} \]
\[ [\epsilon_{0gk}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.390(0.028) \end{bmatrix} \]
\[-2^{*}\text{loglikelihood (IGLS Deviance)} = 2347.206(977 of 1716 cases in use)\]
Opposite-Sex Relations: Model 2a
\[ \text{oppsex}_{\text{b}} \sim N(\mu, \Omega) \]
\[ \beta_{\text{oppsex}_{\text{b}}} = \beta_{\text{b}1}\text{cons} + 0.606(0.030)\text{t1oppsex}_{\text{b}} + -0.012(0.024)\text{time}_{\text{pe}} + 0.084(0.029)\text{expvs.c1c2}_{\text{pe}} + 0.007(0.034)\text{c1vs.e2}_{\text{pe}} + -0.003(0.020)\text{expvs.e1c2.time}_{\text{pe}} + 0.019(0.024)\text{c1vs.e2.time}_{\text{pe}} \]
\[ \beta_{\text{oppsex}_{\text{b}}} = 0.011(0.035) + \nu_{\text{oppsex}_{\text{b}}} + u_{\text{oppsex}_{\text{b}}} + e_{\text{oppsex}_{\text{b}}} \]
\[ [\nu_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = [0.000(0.000)] \]
\[ [u_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{u}) : \Omega_{u} = [0.304(0.036)] \]
\[ [e_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{e}) : \Omega_{e} = [0.390(0.028)] \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2337.917(977 of 1716 cases in use)\]

Opposite-Sex Relations: Model 2b
\[ \text{oppsex}_{\text{b}} \sim N(\mu, \Omega) \]
\[ \beta_{\text{oppsex}_{\text{b}}} = \beta_{\text{b}1}\text{cons} + 0.606(0.030)\text{t1oppsex}_{\text{b}} + -0.012(0.024)\text{time}_{\text{pe}} + 0.045(0.021)\text{expvs.e2c1}_{\text{pe}} + 0.122(0.048)\text{expvs.e2}_{\text{pe}} + 0.008(0.015)\text{expvs.e1c2.time}_{\text{pe}} + -0.013(0.033)\text{expvs.e2.time}_{\text{pe}} \]
\[ \beta_{\text{oppsex}_{\text{b}}} = 0.011(0.035) + \nu_{\text{oppsex}_{\text{b}}} + u_{\text{oppsex}_{\text{b}}} + e_{\text{oppsex}_{\text{b}}} \]
\[ [\nu_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = [0.000(0.000)] \]
\[ [u_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{u}) : \Omega_{u} = [0.304(0.036)] \]
\[ [e_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{e}) : \Omega_{e} = [0.390(0.028)] \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2337.917(977 of 1716 cases in use)\]

Opposite-Sex Relations: Model 2c
\[ \text{oppsex}_{\text{b}} \sim N(\mu, \Omega) \]
\[ \beta_{\text{oppsex}_{\text{b}}} = \beta_{\text{b}1}\text{cons} + 0.606(0.030)\text{t1oppsex}_{\text{b}} + -0.012(0.024)\text{time}_{\text{pe}} + -0.035(0.023)\text{e2vs.c1exp}_{\text{b}} + 0.129(0.046)\text{expvs.c1}_{\text{b}} + 0.011(0.016)\text{e2vs.c1exp.time}_{\text{b}} + 0.005(0.021)\text{expvs.c1.time}_{\text{b}} \]
\[ \beta_{\text{oppsex}_{\text{b}}} = 0.011(0.035) + \nu_{\text{oppsex}_{\text{b}}} + u_{\text{oppsex}_{\text{b}}} + e_{\text{oppsex}_{\text{b}}} \]
\[ [\nu_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = [0.000(0.000)] \]
\[ [u_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{u}) : \Omega_{u} = [0.304(0.036)] \]
\[ [e_{\text{oppsex}_{\text{b}}}] \sim N(0, \Omega_{e}) : \Omega_{e} = [0.390(0.028)] \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2337.917(977 of 1716 cases in use)\]
Opposite-Sex Relations: Model 3
\[ \text{oppsx}_{jk} \sim N(\mu, \Omega) \]
\[ \text{oppsx}_{jk} = \beta_{0jk}\text{cons} + 0.563(0.038)\text{t1oppsx}_{jk} + 0.091(0.028)\text{expvs.c1e}_{jk} + 0.002(0.033)\text{c1vs.c2}_{jk} + 
-0.016(0.021)\text{time}_{jk} + -0.035(0.033)\text{t1oppsx .expvs.c1e}_{jk} + 0.064(0.032)\text{t1oppsx .c1vs.c2}_{jk} + 
-0.027(0.026)\text{t1oppsx .time}_{jk} + 0.009(0.022)\text{t1oppsx .expvs.c1e2.time}_{jk} + 
0.045(0.023)\text{t1oppsx .c1vs.c2.time}_{jk} \]
\[ \beta_{0jk} = 0.017(0.015) + v_{0jk} + u_{0jk} + e_{0jk} \]
\[ \begin{bmatrix} v_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.300(0.036) \end{bmatrix} \]
\[ \begin{bmatrix} e_{0jk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.384(0.029) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 2323.756(977 of 1716 cases in use)\)

Honesty/Trustworthiness: Model 1
\[ \text{honest}_{jk} \sim N(\mu, \Omega) \]
\[ \text{honest}_{jk} = \beta_{0jk}\text{cons} \]
\[ \beta_{0jk} = -0.053(0.050) + v_{0jk} + u_{0jk} + e_{0jk} \]
\[ \begin{bmatrix} v_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.014(0.016) \end{bmatrix} \]
\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.319(0.055) \end{bmatrix} \]
\[ \begin{bmatrix} e_{0jk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.419(0.029) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 3186.109(1141 of 1716 cases in use)\)

Honesty/Trustworthiness: Model 1b
\[ \text{honest}_{jk} \sim N(\mu, \Omega) \]
\[ \text{honest}_{jk} = \beta_{0jk}\text{cons} + 0.658(0.051)\text{t1honest}_{jk} \]
\[ \beta_{0jk} = -0.054(0.021) + v_{0jk} + u_{0jk} + e_{0jk} \]
\[ \begin{bmatrix} v_{0jk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.336(0.036) \end{bmatrix} \]
\[ \begin{bmatrix} e_{0jk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.354(0.026) \end{bmatrix} \]

\(-2\times\text{loglikelihood(IGLS Deviance)} = 2311.303(977 of 1716 cases in use)\)
Honesty/Trustworthiness: Model 2a
\[ \text{honest}_{y} \sim N(\Omega_{x}, \Omega) \]
\[ \text{honest}_{y} = \beta_{y} + 0.648(0.030) \text{time}_{t} + 0.009(0.023) \text{time}_{p} + 0.109(0.029) \text{expvs.c1} + -0.002(0.023) \text{c1vs.c2.time}_{p} + -0.016(0.019) \text{expvs.c1} + 0.013(0.023) \text{c1vs.c2.time}_{p} \]
\[ \beta_{y} = 0.009(0.035) + v_{y} + u_{y} + e_{y} \]
\[ v_{y} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ u_{y} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.322(0.036) \end{bmatrix} \]
\[ e_{y} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.354(0.026) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2295.843(977 of 1716 cases in use)\]

Honesty/Trustworthiness: Model 2b
\[ \text{honest}_{y} \sim N(\Omega_{x}, \Omega) \]
\[ \text{honest}_{y} = \beta_{y} + 0.648(0.030) \text{time}_{t} + 0.009(0.023) \text{time}_{p} + 0.054(0.021) \text{expvs.c2} + 0.164(0.048) \text{expvs.c1} + -0.002(0.014) \text{expvs.c2} + -0.031(0.031) \text{expvs.c2} + -0.031(0.031) \text{expvs.c2} \]
\[ \beta_{y} = 0.009(0.035) + v_{y} + u_{y} + e_{y} \]
\[ v_{y} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ u_{y} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.322(0.036) \end{bmatrix} \]
\[ e_{y} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.354(0.026) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2295.843(977 of 1716 cases in use)\]

Honesty/Trustworthiness: Model 2c
\[ \text{honest}_{y} \sim N(\Omega_{x}, \Omega) \]
\[ \text{honest}_{y} = \beta_{y} + 0.648(0.030) \text{time}_{t} + 0.009(0.023) \text{time}_{p} + 0.055(0.023) \text{c2vs.c1} + 0.165(0.046) \text{expvs.c1} + -0.015(0.015) \text{c2vs.c1} + \text{expvs.c1} + 0.018(0.036) \text{expvs.c1} + \text{time}_{p} \]
\[ \beta_{y} = 0.009(0.035) + v_{y} + u_{y} + e_{y} \]
\[ v_{y} \sim N(0, \Omega_{v}) : \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ u_{y} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.322(0.036) \end{bmatrix} \]
\[ e_{y} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.354(0.026) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2295.843(977 of 1716 cases in use)\]
Honesty/Trustworthiness: Model 3
\[\text{honest}_{i,k} \sim N(XB, \Omega)\]
\[\text{honest}_{i,k} = \beta_{0} + \text{cons} + 0.635(0.033)t\text{honest}_{i,k} + 0.116(0.030)\text{expvs.c1c2}_{i,k} + 0.004(0.033)\text{c1vs.c2}_{i,k} +
-0.003(0.021)t\text{honest}_\text{time}_{i,k} + -0.027(0.033)t\text{honest.expvs.c1c2}_{i,k} + 0.002(0.032)t\text{honest.c1vs.c2}_{i,k} +
0.009(0.025)t\text{honest.time}_{i,k} + 0.007(0.021)t\text{honest.expvs.c1c2.time}_{i,k} +
0.006(0.022)t\text{honest.c1vs.c2.time}_{i,k}\]
\[\beta_{0} = 0.015(0.036) + v_{0}\] + \[u_{i,k} + \epsilon_{i,k}\]
\[\left[v_{0}\right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}\]
\[\left[u_{i,k}\right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.311(0.036) \end{bmatrix}\]
\[\left[\epsilon_{i,k}\right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.354(0.026) \end{bmatrix}\]
\[-2\text{loglikelihood(IGLS Deviance)} = 2295.929(977 of 1716 cases in use)\]

Parent Relations: Model 1
\[\text{parent}_{i,k} \sim N(XB, \Omega)\]
\[\text{parent}_{i,k} = \beta_{0} + \text{cons}\]
\[\beta_{0} = 0.151(0.056) + v_{0} + u_{i,k} + \epsilon_{i,k}\]
\[\left[v_{0}\right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}\]
\[\left[u_{i,k}\right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.642(0.053) \end{bmatrix}\]
\[\left[\epsilon_{i,k}\right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.420(0.030) \end{bmatrix}\]
\[-2\text{loglikelihood(IGLS Deviance)} = 3132.368(1141 of 1716 cases in use)\]

Parent Relations: Model 1b
\[\text{parent}_{i,k} \sim N(XB, \Omega)\]
\[\text{parent}_{i,k} = \beta_{0} + \text{cons} + 0.624(0.003)t\text{parent}_{i,k}\]
\[\beta_{0} = 0.136(0.031) + v_{0} + u_{i,k} + \epsilon_{i,k}\]
\[\left[v_{0}\right] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.002) \end{bmatrix}\]
\[\left[u_{i,k}\right] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.100(0.034) \end{bmatrix}\]
\[\left[\epsilon_{i,k}\right] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.344(0.027) \end{bmatrix}\]
\[-2\text{loglikelihood(IGLS Deviance)} = 2279.242(977 of 1716 cases in use)\]
Parent Relations: Model 2a
\[ \text{parent}_{qk} \sim N(X_{qk}, \Omega) \]
\[ \beta_{qk} = \beta_{qk, \text{cons}} + 0.632(0.039) \text{time}_{qk} + 0.013(0.024) \text{time}_{qk} + 0.036(0.028) \expv_{qk} + 0.020(0.032) \expv_{k2, qk} + 0.006(0.019) \expv_{k2, qk} + 0.036(0.028) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} \]
\[ \beta_{qk} = -0.121(0.037) + v_{qk} + u_{qk} + e_{qk} \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[-2\text{loglikelihood(GLS Deviance)} = 2275.343(977 of 1716 cases in use)\]

Parent Relations: Model 2b
\[ \text{parent}_{qk} \sim N(X_{qk}, \Omega) \]
\[ \beta_{qk} = \beta_{qk, \text{cons}} + 0.632(0.039) \text{time}_{qk} + 0.013(0.024) \text{time}_{qk} + 0.036(0.028) \expv_{qk} + 0.020(0.032) \expv_{k2, qk} + 0.006(0.019) \expv_{k2, qk} + 0.036(0.028) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} \]
\[ \beta_{qk} = -0.121(0.037) + v_{qk} + u_{qk} + e_{qk} \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[-2\text{loglikelihood(GLS Deviance)} = 2275.343(977 of 1716 cases in use)\]

Parent Relations: Model 2c
\[ \text{parent}_{qk} \sim N(X_{qk}, \Omega) \]
\[ \beta_{qk} = \beta_{qk, \text{cons}} + 0.632(0.039) \text{time}_{qk} + 0.013(0.024) \text{time}_{qk} + 0.036(0.028) \expv_{qk} + 0.020(0.032) \expv_{k2, qk} + 0.006(0.019) \expv_{k2, qk} + 0.036(0.028) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} + 0.026(0.025) \expv_{k2, qk} \]
\[ \beta_{qk} = -0.121(0.037) + v_{qk} + u_{qk} + e_{qk} \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[ \begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) \]
\[-2\text{loglikelihood(GLS Deviance)} = 2275.343(977 of 1716 cases in use)\]
Parent Relations: Model 3

\[ \text{parent}_{qk} \sim N(X_2, \Omega) \]

\[ \beta_{qk} = \beta_{0q} + \alpha_{1q} \text{parent}_{qk} + 0.031(0.028) \text{expvs.c1c2}_{qk} - 0.023(0.032) \text{clvs.c2}_{qk} + \\ -0.015(0.021) \text{time}_{qk} + 0.057(0.033) \text{parent.expvs.c1c2}_{qk} + 0.020(0.032) \text{parent.clvs.c2}_{qk} + \\ -0.045(0.026) \text{time.parent}_{qk} + 0.012(0.022) \text{parent.expvs.c1c2.time}_{qk} + \\ 0.000(0.023) \text{parent.clvs.c2.time}_{qk} \]

\[ \beta_{0q} = -0.127(0.036) + v_{0q} + u_{0q} + \epsilon_{0q} \]

\[ \begin{bmatrix} v_{0q} \\ u_{0q} \\ \epsilon_{0q} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.000(0.002) \\ 0.270(0.034) \\ 0.391(0.027) \end{bmatrix} \]

\[-2\times\text{loglikelihood(IQLS Deviance)} = 2267.152(977 of 1716 cases in use)\]

Emotional Stability: Model 1

\[ \text{emtsb}_{qk} \sim N(X_2, \Omega) \]

\[ \beta_{qk} = \beta_{0q} + \alpha_{1q} \text{emtsb}_{qk} \]

\[ \beta_{0q} = -0.109(0.048) + v_{0q} + u_{0q} + \epsilon_{0q} \]

\[ \begin{bmatrix} v_{0q} \\ u_{0q} \\ \epsilon_{0q} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.002(0.005) \\ 0.444(0.058) \\ 0.421(0.029) \end{bmatrix} \]

\[-2\times\text{loglikelihood(IQLS Deviance)} = 3195.788(1141 of 1716 cases in use)\]

Emotional Stability: Model 1b

\[ \text{emtsb}_{qk} \sim N(X_2, \Omega) \]

\[ \beta_{qk} = \beta_{0q} + \alpha_{1q} \text{emtsb}_{qk} \]

\[ \beta_{0q} = -0.092(0.051) + v_{0q} + u_{0q} + \epsilon_{0q} \]

\[ \begin{bmatrix} v_{0q} \\ u_{0q} \\ \epsilon_{0q} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.304(0.038) \\ 0.414(0.030) \end{bmatrix} \]

\[-2\times\text{loglikelihood(IQLS Deviance)} = 2379.690(977 of 1716 cases in use)\]
Emotional Stability: Model 2a
\[ \text{emtstab}_{igc} \sim \mathcal{N}(X_{igc}, \Omega) \]
\[ \text{emtstab}_{igc} = \beta_{0gc} + \beta_{1gc} t_{igc} + \beta_{2gc} \text{emtstab}_{igc} + \beta_{3gc} \text{time}_{igc} + \beta_{4gc} \text{expvs.c1c2}_{igc} \]
\[ \beta_{0gc} = -0.093(0.036), \quad \beta_{1gc} = 0.042(0.025), \quad \beta_{2gc} = 0.009(0.030), \quad \beta_{3gc} = 0.004(0.034), \quad \beta_{4gc} = 0.024(0.024) \]
\[ v_{igc} \sim \mathcal{N}(0, \Omega_v) \quad : \quad \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ u_{igc} \sim \mathcal{N}(0, \Omega_u) \quad : \quad \Omega_u = \begin{bmatrix} 0.360 & 0.038 \\ 0.038 & 0.360 \end{bmatrix} \]
\[ e_{igc} \sim \mathcal{N}(0, \Omega_e) \quad : \quad \Omega_e = \begin{bmatrix} 0.411 & 0.030 \\ 0.030 & 0.411 \end{bmatrix} \]
\[-2\text{loglikelihood(IGLS Deviance)} = 2375.275 (977 of 1716 cases in use)\]

Emotional Stability: Model 2b
\[ \text{emtstab}_{igc} \sim \mathcal{N}(X_{igc}, \Omega) \]
\[ \text{emtstab}_{igc} = \beta_{0gc} + \beta_{1gc} t_{igc} + \beta_{2gc} \text{emtstab}_{igc} + \beta_{3gc} \text{time}_{igc} + \beta_{4gc} \text{expvs.c1c2}_{igc} \]
\[ \beta_{0gc} = -0.093(0.036), \quad \beta_{1gc} = 0.042(0.025), \quad \beta_{2gc} = 0.009(0.030), \quad \beta_{3gc} = 0.004(0.034), \quad \beta_{4gc} = 0.024(0.024) \]
\[ v_{igc} \sim \mathcal{N}(0, \Omega_v) \quad : \quad \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ u_{igc} \sim \mathcal{N}(0, \Omega_u) \quad : \quad \Omega_u = \begin{bmatrix} 0.360 & 0.038 \\ 0.038 & 0.360 \end{bmatrix} \]
\[ e_{igc} \sim \mathcal{N}(0, \Omega_e) \quad : \quad \Omega_e = \begin{bmatrix} 0.411 & 0.030 \\ 0.030 & 0.411 \end{bmatrix} \]
\[-2\text{loglikelihood(IGLS Deviance)} = 2375.275 (977 of 1716 cases in use)\]

Emotional Stability: Model 2c
\[ \text{emtstab}_{igc} \sim \mathcal{N}(X_{igc}, \Omega) \]
\[ \text{emtstab}_{igc} = \beta_{0gc} + \beta_{1gc} t_{igc} + \beta_{2gc} \text{emtstab}_{igc} + \beta_{3gc} \text{time}_{igc} + \beta_{4gc} \text{expvs.c1c2}_{igc} \]
\[ \beta_{0gc} = -0.093(0.036), \quad \beta_{1gc} = 0.042(0.025), \quad \beta_{2gc} = 0.009(0.030), \quad \beta_{3gc} = 0.004(0.034), \quad \beta_{4gc} = 0.024(0.024) \]
\[ v_{igc} \sim \mathcal{N}(0, \Omega_v) \quad : \quad \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ u_{igc} \sim \mathcal{N}(0, \Omega_u) \quad : \quad \Omega_u = \begin{bmatrix} 0.360 & 0.038 \\ 0.038 & 0.360 \end{bmatrix} \]
\[ e_{igc} \sim \mathcal{N}(0, \Omega_e) \quad : \quad \Omega_e = \begin{bmatrix} 0.411 & 0.030 \\ 0.030 & 0.411 \end{bmatrix} \]
\[-2\text{loglikelihood(IGLS Deviance)} = 2375.275 (977 of 1716 cases in use)\]
Emotional Stability: Model 3

\[ \text{emtshb}_{jk} \sim N(X_{\Omega}, \Omega) \]

\[
\begin{align*}
\text{emtshb}_{jk} &= \beta_{0jk} \text{cons} + 0.673(0.036) \text{emtshb}_{jk} + 0.006(0.030) \text{expvs.c1c2}_{jk} + 0.009(0.034) \text{c1vs.c2}_{jk} + \\
&-0.041(0.022) \text{time}_{jk} + 0.023(0.030) \text{k1emtshb.expvs.c1c2}_{jk} + 0.018(0.035) \text{k1emtshb.c1vs.c2}_{jk} + \\
&-0.003(0.025) \text{k1emtshb.time}_{jk} + 0.022(0.020) \text{k1emtshb.expvs.c1c2.time}_{jk} + \\
&-0.012(0.025) \text{k1emtshb.c1vs.c2.time}_{jk} \\
\beta_{0jk} &= -0.096(0.036) + \nu_{0jk} + u_{0jk} + e_{0jk}
\end{align*}
\]

\[
\begin{align*}
[\nu_{0jk}] &\sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
[u_{0jk}] &\sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.309(0.038) \end{bmatrix} \\
[e_{0jk}] &\sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.409(0.030) \end{bmatrix}
\end{align*}
\]

\[-2^{\text{log likelihood IGLS Deviance}} = 2373.832(977 of 1716 cases in use)\]

Verbal: Model 1

\[ \text{verbal}_{jk} \sim N(X_{\Omega}, \Omega) \]

\[
\begin{align*}
\text{verbal}_{jk} &= \beta_{0jk} \text{cons} \\
\beta_{0jk} &= -0.012(0.125) + \nu_{0jk} + u_{0jk} + e_{0jk}
\end{align*}
\]

\[
\begin{align*}
[\nu_{0jk}] &\sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.042(0.038) \end{bmatrix} \\
[u_{0jk}] &\sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.340(0.054) \end{bmatrix} \\
[e_{0jk}] &\sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.234(0.016) \end{bmatrix}
\end{align*}
\]

\[-2^{\text{log likelihood IGLS Deviance}} = 2931.487(1141 of 1716 cases in use)\]

Verbal: Model 1b

\[ \text{verbal}_{jk} \sim N(X_{\Omega}, \Omega) \]

\[
\begin{align*}
\text{verbal}_{jk} &= \beta_{0jk} \text{cons} - 0.684(0.030) \text{1verbal}_{jk} \\
\beta_{0jk} &= 0.009(0.070) - \nu_{0jk} - u_{0jk} - e_{0jk}
\end{align*}
\]

\[
\begin{align*}
[\nu_{0jk}] &\sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.012(0.012) \end{bmatrix} \\
[u_{0jk}] &\sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.355(0.032) \end{bmatrix} \\
[e_{0jk}] &\sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.216(0.016) \end{bmatrix}
\end{align*}
\]

\[-2^{\text{log likelihood IGLS Deviance}} = 2081.030(977 of 1716 cases in use)\]
**Verbal: Model 2a**

\[
\text{verbal}_{gk} \sim N(\mu, \Omega)
\]

\[
\text{verbal}_{gk} = \beta_{gk}\text{cons} + 0.688(0.030)\text{verbal}_{g} + 0.016(0.018)\text{time}_{gk} + 0.042(0.028)\text{expvs.c1e2}_{gk} + \\
0.115(0.032)\text{expvs.c2}_{gk} - 0.000(0.015)\text{expvs.c1e2.time}_{gk} + -0.021(0.015)\text{c1vs.c2.time}_{gk}
\]

\[
\beta_{gk} = 0.052(0.074) + \nu_{gk} + \pi_{gk} + \epsilon_{gk}
\]

\[
\begin{bmatrix} \nu_{gk} \\ \pi_{gk} \\ \epsilon_{gk} \end{bmatrix} \sim N(0, \Omega) \quad : \quad \Omega = \begin{bmatrix} 0.013(0.013) \\ 0.364(0.031) & 0.215(0.016) \end{bmatrix}
\]

\[ -2\text{loglikelihood}(IGLS Deviance) = 2061.124(977 of 1716 cases in use) \]

**Verbal: Model 2b**

\[
\text{verbal}_{gk} \sim N(\mu, \Omega)
\]

\[
\text{verbal}_{gk} = \beta_{gk}\text{cons} + 0.688(0.030)\text{verbal}_{g} + 0.016(0.018)\text{time}_{gk} + 0.079(0.020)\text{expvs2vs.c1}_{gk} + \\
0.006(0.046)\text{expvs.c2}_{gk} - 0.011(0.011)\text{expvs2vs.c1.time}_{gk} + 0.010(0.025)\text{expvs.c2.time}_{gk}
\]

\[
\beta_{gk} = 0.052(0.074) + \nu_{gk} + \pi_{gk} + \epsilon_{gk}
\]

\[
\begin{bmatrix} \nu_{gk} \\ \pi_{gk} \\ \epsilon_{gk} \end{bmatrix} \sim N(0, \Omega) \quad : \quad \Omega = \begin{bmatrix} 0.013(0.013) \\ 0.364(0.031) & 0.215(0.016) \end{bmatrix}
\]

\[ -2\text{loglikelihood}(IGLS Deviance) = 2061.124(977 of 1716 cases in use) \]

**Verbal: Model 2c**

\[
\text{verbal}_{gk} \sim N(\mu, \Omega)
\]

\[
\text{verbal}_{gk} = \beta_{gk}\text{cons} + 0.688(0.030)\text{verbal}_{g} - 0.016(0.018)\text{time}_{gk} - 0.036(0.022)\text{c2vs.c1exp}_{gk} + \\
0.121(0.044)\text{expvs.c1}_{gk} - 0.011(0.012)\text{c2vs.c1exp.time}_{gk} + -0.011(0.021)\text{expvs.c1.time}_{gk}
\]

\[
\beta_{gk} = 0.052(0.074) + \nu_{gk} + \pi_{gk} + \epsilon_{gk}
\]

\[
\begin{bmatrix} \nu_{gk} \\ \pi_{gk} \\ \epsilon_{gk} \end{bmatrix} \sim N(0, \Omega) \quad : \quad \Omega = \begin{bmatrix} 0.013(0.013) \\ 0.364(0.031) & 0.215(0.016) \end{bmatrix}
\]

\[ -2\text{loglikelihood}(IGLS Deviance) = 2061.125(977 of 1716 cases in use) \]
Verbal: Model 3
\[
\text{verbal}_{qk} \sim N(\mu, \Omega)
\]
\[
\text{verbal}_{qk} = \beta_{qk}\text{cons} + 0.671(0.036)\text{t1verbal}_{qk} + 0.048(0.029)\text{expvs.c1c2}_{qk} + 0.119(0.032)\text{clvs.c2}_{qk} + 0.020(0.016)\text{time}_{qk} + 0.020(0.030)\text{t1verbal.expvs.c1c2}_{qk} + 0.020(0.003)\text{t1verbal.clvs.c2}_{qk} + 0.017(0.019)\text{t1verbal.time}_{qk} + 0.022(0.016)\text{t1verbal.expvs.c1c2.time}_{qk} + 0.020(0.018)\text{t1verbal.clvs.c2.time}_{qk}
\]
\[
\beta_{qk} = 0.057(0.074) + \nu_{qk} + \mu_{qk} + \epsilon_{qk}
\]
\[
\begin{bmatrix}
\nu_{qk} \\
\mu_{qk} \\
\epsilon_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.013(0.013) \\
0.365(0.031) \\
0.213(0.016)
\end{bmatrix}
\]
\[-2\text{loglikelihood}(IGLS Deviance) = 2058.254(977 of 1716 cases in use)\]

Math: Model 1
\[
\text{math}_{qk} \sim N(\mu, \Omega)
\]
\[
\text{math}_{qk} = \beta_{qk}\text{cons}
\]
\[
\beta_{qk} = -0.074(0.054) + \nu_{qk} + \mu_{qk} + \epsilon_{qk}
\]
\[
\begin{bmatrix}
\nu_{qk} \\
\mu_{qk} \\
\epsilon_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.004(0.007) \\
0.79(0.054) \\
0.299(0.021)
\end{bmatrix}
\]
\[-2\text{loglikelihood}(IGLS Deviance) = 3007.693(1137 of 1716 cases in use)\]

Math: Model 1b
\[
\text{math}_{qk} \sim N(\mu, \Omega)
\]
\[
\text{math}_{qk} = \beta_{qk}\text{cons} + 0.76(0.027)\text{t1math}_{qk}
\]
\[
\beta_{qk} = -0.113(0.024) + \nu_{qk} + \mu_{qk} + \epsilon_{qk}
\]
\[
\begin{bmatrix}
\nu_{qk} \\
\mu_{qk} \\
\epsilon_{qk}
\end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix}
0.001(0.003) \\
0.243(0.028) \\
0.257(0.021)
\end{bmatrix}
\]
\[-2\text{loglikelihood}(IGLS Deviance) = 2058.921(973 of 1716 cases in use)\]

505
Math: Model 2a
\[
\text{math}_{pq} \sim \mathcal{N}(\mathcal{X}, \Omega)
\]
\[
\text{math}_{pq} = \beta_{pq} \times \text{cons} + 0.761(0.027) \times \text{math}_{pq} + 0.021(0.021) \times \text{time}_{pq} + 0.002(0.026) \times \text{expvs.c1c2}_{pq} + 0.052(0.029) \times \text{expvs.c2.time}_{pq} + 0.029(0.017) \times \text{expvs.c2.time}_{pq} + 0.050(0.020) \times \text{expvs.c2.time}_{pq}
\]
\[
\beta_{pq} = -0.105(0.031) + v_{pq} + u_{pq} + e_{pq}
\]
\[
\begin{bmatrix}
  v_{pq} \\
  u_{pq} \\
  e_{pq}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_v): \quad \Omega_v = \begin{bmatrix}
  0.001(0.002) \\
  0.244(0.028) \\
  0.263(0.021)
\end{bmatrix}
\]

\(-2\times \text{loglikelihood(IGLS Deviance)} = 2050.996(973 \text{ of } 1716 \text{ cases in use})

Math: Model 2b
\[
\text{math}_{pq} \sim \mathcal{N}(\mathcal{X}, \Omega)
\]
\[
\text{math}_{pq} = \beta_{pq} \times \text{cons} + 0.761(0.027) \times \text{math}_{pq} + 0.021(0.021) \times \text{time}_{pq} + 0.027(0.019) \times \text{expvs.c1c2} + 0.023(0.042) \times \text{expvs.c2.time}_{pq} + 0.030(0.013) \times \text{expvs.c1.time}_{pq} + 0.029(0.028) \times \text{expvs.c2.time}_{pq}
\]
\[
\beta_{pq} = -0.105(0.031) + v_{pq} + u_{pq} + e_{pq}
\]
\[
\begin{bmatrix}
  v_{pq} \\
  u_{pq} \\
  e_{pq}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_v): \quad \Omega_v = \begin{bmatrix}
  0.001(0.002) \\
  0.244(0.028) \\
  0.263(0.021)
\end{bmatrix}
\]

\(-2\times \text{loglikelihood(IGLS Deviance)} = 2050.996(973 \text{ of } 1716 \text{ cases in use})

Math: Model 2c
\[
\text{math}_{pq} \sim \mathcal{N}(\mathcal{X}, \Omega)
\]
\[
\text{math}_{pq} = \beta_{pq} \times \text{cons} + 0.761(0.027) \times \text{math}_{pq} + 0.021(0.021) \times \text{time}_{pq} + 0.025(0.020) \times \text{expvs.c1c2} + 0.029(0.040) \times \text{expvs.c1} + 0.000(0.014) \times \text{expvs.c2} + 0.059(0.027) \times \text{expvs.c1.time}_{pq} + 0.058(0.027) \times \text{expvs.c1.time}_{pq}
\]
\[
\beta_{pq} = -0.105(0.031) + v_{pq} + u_{pq} + e_{pq}
\]
\[
\begin{bmatrix}
  v_{pq} \\
  u_{pq} \\
  e_{pq}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_v): \quad \Omega_v = \begin{bmatrix}
  0.001(0.002) \\
  0.244(0.028) \\
  0.263(0.021)
\end{bmatrix}
\]

\(-2\times \text{loglikelihood(IGLS Deviance)} = 2050.996(973 \text{ of } 1716 \text{ cases in use})

506
Math: Model 3
\[ \text{math}_{gk} \sim N(XB, \Omega) \]
\[ \text{math}_{gk} = \beta_{0gk} + 0.766(0.032)t1\text{math}_{gk} + -0.007(0.026)\text{expvst.c1c2}_{gk} + 0.045(0.029)\text{clvs.c2}_{gk} + 0.005(0.019)\text{time}_{gk} + 0.029(0.027)t1\text{math .expvst.c1c2}_{gk} + -0.033(0.031)t1\text{math .clvs.c2}_{gk} + -0.040(0.022)t1\text{math .time}_{gk} + -0.009(0.018)t1\text{math .expvst.c1c2.time}_{gk} + -0.003(0.022)t1\text{math .clvs.c2.time}_{gk} \]
\[ \beta_{gk} = -0.110(0.036) + v_{gk} + u_{gk} + e_{gk} \]
\[ [v_{gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.001(0.002) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.240(0.028) \end{bmatrix} \]
\[ [e_{gk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.285(0.021) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2050.830 (973 of 1716 cases in use)

General School: Model 1
\[ \text{gnschl}_{gk} \sim N(XB, \Omega) \]
\[ \text{gnschl}_{gk} = \beta_{0gk} + v_{gk} + u_{gk} + e_{gk} \]
\[ [v_{gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.806(0.055) \end{bmatrix} \]
\[ [e_{gk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.246(0.017) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2955.242 (1141 of 1716 cases in use)

General School: Model 1b
\[ \text{gnschl}_{gk} \sim N(XB, \Omega) \]
\[ \text{gnschl}_{gk} = \beta_{0gk} + v_{gk} + u_{gk} + e_{gk} \]
\[ [v_{gk}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.002(0.005) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.581(0.033) \end{bmatrix} \]
\[ [e_{gk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.245(0.015) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2150.170 (977 of 1716 cases in use)
General School: Model 2a
\[ \text{gschl}_{ge} \sim N(X_{ge}, \Omega) \]

\[ \text{gschl}_{ge} = \beta_{0ge}\text{cons} + 0.683(0.031)\text{glmshl}_{ge} + 0.015(0.019)\text{time}_{ge} + 0.069(0.029)\text{expvs.c1c2}_{ge} + 0.097(0.033)\text{c1vs.c2}_{ge} + -0.002(0.016)\text{expvs.c1c2.time}_{ge} + -0.011(0.019)\text{c1vs.c2.time}_{ge} \]

\[ \beta_{0ge} = -0.039(0.055) + \nu_{0ge} + \epsilon_{0ge} \]

\[ \nu_{0ge} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.005 & 0.007 \\ 0.007 & 0.009 \end{bmatrix} \]

\[ \mu_{0ge} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.366 & 0.032 \\ 0.032 & 0.034 \end{bmatrix} \]

\[ \epsilon_{0ge} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.245 & 0.018 \\ 0.018 & 0.020 \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2132.815 (977 of 1716 cases in use)

General School: Model 2b
\[ \text{gschl}_{ge} \sim N(X_{ge}, \Omega) \]

\[ \text{gschl}_{ge} = \beta_{0ge}\text{cons} + 0.683(0.031)\text{glmshl}_{ge} + 0.015(0.019)\text{time}_{ge} + 0.083(0.021)\text{expvs.c1c2}_{ge} + 0.055(0.047)\text{expvs.c2c3}_{ge} + -0.006(0.012)\text{expvs.c1c2.time}_{ge} + 0.003(0.027)\text{expvs.c2c3.time}_{ge} \]

\[ \beta_{0ge} = -0.039(0.055) + \nu_{0ge} + \epsilon_{0ge} \]

\[ \nu_{0ge} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.005 & 0.007 \\ 0.007 & 0.009 \end{bmatrix} \]

\[ \mu_{0ge} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.366 & 0.032 \\ 0.032 & 0.034 \end{bmatrix} \]

\[ \epsilon_{0ge} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.245 & 0.018 \\ 0.018 & 0.020 \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2132.815 (977 of 1716 cases in use)

General School: Model 2c
\[ \text{gschl}_{ge} \sim N(X_{ge}, \Omega) \]

\[ \text{gschl}_{ge} = \beta_{0ge}\text{cons} + 0.683(0.031)\text{glmshl}_{ge} + 0.015(0.019)\text{time}_{ge} + 0.014(0.025)\text{c2vs.c1exp}_{ge} + 0.152(0.045)\text{expvs.c1}_{ge} + -0.006(0.015)\text{c2vs.c1exp.time}_{ge} + -0.008(0.025)\text{expvs.c1.time}_{ge} \]

\[ \beta_{0ge} = -0.039(0.055) + \nu_{0ge} + \epsilon_{0ge} \]

\[ \nu_{0ge} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.005 & 0.007 \\ 0.007 & 0.009 \end{bmatrix} \]

\[ \mu_{0ge} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.366 & 0.032 \\ 0.032 & 0.034 \end{bmatrix} \]

\[ \epsilon_{0ge} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.245 & 0.018 \\ 0.018 & 0.020 \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2132.815 (977 of 1716 cases in use)
General School: Model 3
\[ \text{gnschl}_{gk} \sim N(\mathbf{X}_g, \Omega) \]
\[ \text{gnschl}_{gk} = \beta_{gk} \text{cons} + 0.660(0.040) \times \text{gnschl}_{gk} + 0.075(0.032) \times \text{expvs.c1c2}_{gk} + 0.099(0.033) \times \text{clvs.c2}_{gk} + 0.012(0.018) \times \text{time}_{gk} + 0.012(0.035) \times \text{gnschl} \times \text{expvs.c1c2}_{gk} + 0.058(0.033) \times \text{gnschl} \times \text{clvs.c2}_{gk} + 0.011(0.022) \times \text{gnschl} \times \text{time}_{gk} + 0.025(0.018) \times \text{gnschl} \times \text{expvs.c1c2} \times \text{time}_{gk} + 0.007(0.020) \times \text{gnschl} \times \text{clvs.c2} \times \text{time}_{gk} \]
\[ \beta_{gk} = -0.033(0.057) + \nu_{gk} + u_{gk} + \epsilon_{gk} \]
\[ [\nu_{gk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.006(0.007) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.367(0.032) \end{bmatrix} \]
\[ [\epsilon_{gk}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.242(0.018) \end{bmatrix} \]
\[-2^*\text{loglikelihood}(\text{IGLS Deviance}) = 2128.007(977 of 1716 cases in use)\]

Global Self-Esteem: Model 1
\[ \text{gnslf}_{gk} \sim N(\mathbf{X}_g, \Omega) \]
\[ \text{gnslf}_{gk} = \beta_{gk} \text{cons} \]
\[ \beta_{gk} = -0.057(0.038) + \nu_{gk} + u_{gk} + \epsilon_{gk} \]
\[ [\nu_{gk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.006(0.009) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.367(0.057) \end{bmatrix} \]
\[ [\epsilon_{gk}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.352(0.026) \end{bmatrix} \]
\[-2^*\text{loglikelihood}(\text{IGLS Deviance}) = 3150.500(1141 of 1716 cases in use)\]

Global Self-Esteem: Model 1b
\[ \text{gnslf}_{gk} \sim N(\mathbf{X}_g, \Omega) \]
\[ \text{gnslf}_{gk} = \beta_{gk} \text{cons} + 0.604(0.033) \times \text{gnslf}_{gk} \]
\[ \beta_{gk} = -0.046(0.023) + \nu_{gk} + u_{gk} + \epsilon_{gk} \]
\[ [\nu_{gk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.006(0.009) \end{bmatrix} \]
\[ [u_{gk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.426(0.041) \end{bmatrix} \]
\[ [\epsilon_{gk}] \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.342(0.025) \end{bmatrix} \]
\[-2^*\text{loglikelihood}(\text{IGLS Deviance}) = 2381.507(977 of 1716 cases in use)\]

509
Global Self-Esteem: Model 2a

\[ gnsif_{pe} \sim N(\mathbf{X}_p, \Omega) \]

\[ gnsif_{pe} = \beta_{0pe}\text{cons} + 0.596(0.033) \times \text{gnsif}_{pe} - 0.026(0.023) \times \text{time}_{pe} + 0.083(0.032) \times \text{expvs.c1c2}_{pe} + \\
-0.049(0.036) \times \text{c1vs.c2}_{pe} + 0.600(0.019) \times \text{expvs.c1c2.time}_{pe} + 0.012(0.022) \times \text{c1vs.c2.time}_{pe} \]

\[ \beta_{0pe} = -0.010(0.038) + \nu_{0pe} + \mu_{0pe} + e_{0pe} \]

\[ \begin{bmatrix} \nu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ \begin{bmatrix} \mu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.416(0.040) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0pe} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.341(0.025) \end{bmatrix} \]

\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2370.856 (977 of 1716 cases in use)\]

Global Self-Esteem: Model 2b

\[ gnsif_{pe} \sim N(\mathbf{X}_p, \Omega) \]

\[ gnsif_{pe} = \beta_{0pe}\text{cons} + 0.596(0.033) \times \text{gnsif}_{pe} - 0.026(0.023) \times \text{time}_{pe} + 0.017(0.023) \times \text{expvs.c1c2}_{pe} + \\
0.149(0.042) \times \text{expvs.c2}_{pe} + 0.006(0.014) \times \text{expvs.c1c2.time}_{pe} + 0.007(0.031) \times \text{expvs.c2.time}_{pe} \]

\[ \beta_{0pe} = -0.010(0.038) + \nu_{0pe} + \mu_{0pe} + e_{0pe} \]

\[ \begin{bmatrix} \nu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ \begin{bmatrix} \mu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.416(0.040) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0pe} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.341(0.025) \end{bmatrix} \]

\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2370.855 (977 of 1716 cases in use)\]

Global Self-Esteem: Model 2c

\[ gnsif_{pe} \sim N(\mathbf{X}_p, \Omega) \]

\[ gnsif_{pe} = \beta_{0pe}\text{cons} + 0.596(0.033) \times \text{gnsif}_{pe} - 0.026(0.023) \times \text{time}_{pe} + 0.066(0.025) \times \text{c2vs.c1exp}_{pe} + \\
0.101(0.049) \times \text{expvs.c1}_{pe} + 0.006(0.015) \times \text{c2vs.c1exp.time}_{pe} - 0.005(0.030) \times \text{expvs.c1.time}_{pe} \]

\[ \beta_{0pe} = -0.010(0.038) + \nu_{0pe} + \mu_{0pe} + e_{0pe} \]

\[ \begin{bmatrix} \nu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ \begin{bmatrix} \mu_{0pe} \end{bmatrix} \sim N(0, \Omega_0) \quad \Omega_0 = \begin{bmatrix} 0.416(0.040) \end{bmatrix} \]

\[ \begin{bmatrix} e_{0pe} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.341(0.025) \end{bmatrix} \]

\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2370.856 (977 of 1716 cases in use)\]
Global Self-Esteem: Model 3
$\text{gnslf}_{pk} \sim \mathcal{N}(X_{pk}\beta, \Omega)$
$\text{gnslf}_{pk} = \beta_{0pk}\text{cons} + 0.595(0.044)\text{tlgnslf}_{pk} + 0.033(0.033)\text{expvs.c1c2}_{pk} + -0.052(0.036)\text{clvs.c2}_{pk} + -0.028(0.021)\text{time}_{pk} + 0.004(0.039)\text{tlgnslf}.\text{expvs.c1c2}_{pk} + -0.029(0.036)\text{tlgnslf}.\text{clvs.c2}_{pk} + 0.001(0.026)\text{tlgnslf}.\text{time}_{pk} + 0.003(0.022)\text{tlgnslf}.\text{expvs.c1c2.c2.time}_{pk} + 0.000(0.022)\text{tlgnslf}.\text{clvs.c2.time}_{pk}$
$\beta_{0pk} = -0.011(0.039) + v_{0k} + u_{0pk} + e_{0pk}$
$[v_{0k}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}$
$[u_{0pk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.417(0.040) \end{bmatrix}$
$[e_{0pk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.341(0.025) \end{bmatrix}$
$-2^*\text{loglikelihood(GLS Deviance)} = 2370.445(977 of 1716 cases in use)$

ROPE
Self-Confidence: Model 1a
$\text{slfc}_{pk} \sim \mathcal{N}(X_{pk}\beta, \Omega)$
$\text{slfc}_{pk} = \beta_{0pk}\text{cons} + \beta_{0pk}\text{slfc}_{pk}$
$\beta_{0pk} = -0.149(0.037) + v_{0k} + u_{0pk} + e_{0pk}$
$[v_{0k}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}$
$[u_{0pk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.654(0.056) \end{bmatrix}$
$[e_{0pk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.494(0.024) \end{bmatrix}$
$-2^*\text{loglikelihood(GLS Deviance)} = 3229.758(1140 of 1716 cases in use)$

Self-Confidence: Model 1b
$\text{slfc}_{pk} \sim \mathcal{N}(X_{pk}\beta, \Omega)$
$\text{slfc}_{pk} = \beta_{0pk}\text{cons} + 0.592(0.033)\text{tlslfc}_{pk}$
$\beta_{0pk} = -0.154(0.032) + v_{0k} + u_{0pk} + e_{0pk}$
$[v_{0k}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}$
$[u_{0pk}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.302(0.041) \end{bmatrix}$
$[e_{0pk}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.481(0.025) \end{bmatrix}$
$-2^*\text{loglikelihood(GLS Deviance)} = 2482.716(980 of 1716 cases in use)$

511
Self-Confidence: Model 2a
\[ sfcon_{pq} \sim N(\mu, \Omega) \]
\[ sfcon_{pq} = \beta_{pq} + 0.589(0.033)\text{t1}sfcon_{pq} + -0.025(0.026)sfcon_{pq} + 0.093(0.030)\text{exprvs.cle2}\_r + -0.047(0.035)\text{cl1vs.cle2}\_r + 0.002(0.022)\text{exprvs.cle2 time}\_r + 0.013(0.026)\text{cl1vs.cle2 .time}\_r \]
\[ \beta_{pq} = -0.113(0.036) + \nu_{pq} + \eta_{pq} + \epsilon_{pq} \]
\[ \nu_{pq} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ \eta_{pq} \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.290 & 0.040 \\ 0.040 & 0.035 \end{bmatrix} \]
\[ \epsilon_{pq} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.480 & 0.035 \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 2470.168 (980 of 1716 cases in use)\]

Self-Confidence: Model 2b
\[ sfcon_{pq} \sim N(\mu, \Omega) \]
\[ sfcon_{pq} = \beta_{pq} + 0.589(0.033)\text{t1}sfcon_{pq} + -0.025(0.026)sfcon_{pq} + 0.093(0.030)\text{exprvs.cle2}\_r + 0.163(0.049)\text{exprvs.cle2}\_r + 0.002(0.022)\text{exprvs.cle2 time}\_r + 0.013(0.026)\text{exprvs.cle2 .time}\_r \]
\[ \beta_{pq} = -0.113(0.036) + \nu_{pq} + \eta_{pq} + \epsilon_{pq} \]
\[ \nu_{pq} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ \eta_{pq} \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.290 & 0.040 \\ 0.040 & 0.035 \end{bmatrix} \]
\[ \epsilon_{pq} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.480 & 0.035 \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 2470.168 (980 of 1716 cases in use)\]

Self-Confidence: Model 2c
\[ sfcon_{pq} \sim N(\mu, \Omega) \]
\[ sfcon_{pq} = \beta_{pq} + 0.589(0.033)\text{t1}sfcon_{pq} + -0.025(0.026)sfcon_{pq} + -0.025(0.024)\text{cl1vs.cle2}\_r + 0.116(0.047)\text{exprvs.cle2}\_r + 0.002(0.021)\text{exprvs.cle2 time}\_r + 0.010(0.034)\text{exprvs.cle2 .time}\_r \]
\[ \beta_{pq} = -0.113(0.036) + \nu_{pq} + \eta_{pq} + \epsilon_{pq} \]
\[ \nu_{pq} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \]
\[ \eta_{pq} \sim N(0, \Omega_{\eta}) : \Omega_{\eta} = \begin{bmatrix} 0.290 & 0.040 \\ 0.040 & 0.035 \end{bmatrix} \]
\[ \epsilon_{pq} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.480 & 0.035 \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 2470.168 (980 of 1716 cases in use)\]
Self-Confidence: Model 3
slfcon_{ge} \sim N(\Xi B, \Omega)

\beta_{\text{ge}} \text{cons} + 0.585(0.040) \times \text{slfcon}_{ge} + 0.091(0.030) \times \text{expvs.c1c2}_{ge} + -0.049(0.034) \times \text{clvs.c2}_{ge} + -0.025(0.023) \times \text{time}_{ge} + 0.012(0.034) \times \text{slfcon.expvs.c1c2}_{ge} + -0.082(0.035) \times \text{slfcon.clvs.c2}_{ge} + -0.001(0.029) \times \text{slfcon.time}_{ge} + 0.021(0.024) \times \text{slfcon.expvs.c1c2.time}_{ge} + 0.067(0.027) \times \text{slfcon.clvs.c2.time}_{ge}

\beta_{\text{ge}} = -0.113(0.036) + \nu_{\text{ge}} + \mu_{\text{ge}} + \epsilon_{\text{ge}}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.288(0.040) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.470(0.034) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2454.118 (980 of 1716 cases in use)

Self-Efficacy: Model 1a
slfsec_{ge} \sim N(\Xi B, \Omega)

\beta_{\text{ge}} \text{cons} = 0.079(0.064) + \nu_{\text{ge}} + \mu_{\text{ge}} + \epsilon_{\text{ge}}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.009(0.010) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.194(0.042) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.553(0.024) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2877.555 (1140 of 1716 cases in use)

Self-Efficacy: Model 1b
slfsec_{ge} \sim N(\Xi B, \Omega)

\beta_{\text{ge}} \text{cons} = 0.066(0.055) - \nu_{\text{ge}} - \mu_{\text{ge}} - \epsilon_{\text{ge}}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.003(0.002) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.254(0.033) \end{bmatrix}

\begin{bmatrix} \nu_{\text{ge}} \\ \mu_{\text{ge}} \\ \epsilon_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.368(0.027) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2250.123 (980 of 1716 cases in use)
Self-Efficacy: Model 2a
\( slf\_ec = \beta_e\text{Cons} + 0.483(0.029)slf\_ec + 0.021(0.023)\text{time}_{c2} + 0.026(0.027)\text{expvs.c1c2}_{c2} + 0.036(0.031)\text{c1vs.c2}_{c2} - 0.001(0.019)\text{expvs.c1c2}_{c2}.\text{time}_{c2} + 0.019(0.023)\text{c1vs.c2}.\text{time}_{c2} \)
\( \beta_{\text{e}} = 0.059(0.037) + v_{\text{e}} + u_{\text{e}} + e_{\text{e}} \)
\[ \begin{bmatrix} v_{\text{e}} \\ u_{\text{e}} \\ e_{\text{e}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.001(0.003) \\ 0.256(0.033) \\ 0.365(0.027) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2246.363 (980 of 1716 cases in use)\]

Self-Efficacy: Model 2b
\( slf\_ec = \beta_e\text{Cons} + 0.483(0.029)slf\_ec + 0.021(0.023)\text{time}_{c2} + 0.031(0.020)\text{exppc2vs.c1}_{c2} + 0.021(0.045)\text{exppc2vs.c2}_{c2} + 0.009(0.014)\text{exppc2vs.c1}.\text{time}_{c2} + 0.011(0.031)\text{exppc2vs.c2}.\text{time}_{c2} \)
\( \beta_{\text{e}} = 0.059(0.037) + v_{\text{e}} + u_{\text{e}} + e_{\text{e}} \)
\[ \begin{bmatrix} v_{\text{e}} \\ u_{\text{e}} \\ e_{\text{e}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.001(0.003) \\ 0.256(0.033) \\ 0.365(0.027) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2246.363 (980 of 1716 cases in use)\]

Self-Efficacy: Model 2c
\( slf\_ec = \beta_e\text{Cons} + 0.483(0.029)slf\_ec + 0.021(0.023)\text{time}_{c2} + 0.005(0.021)\text{c2vs.c1exp}_{c2} + 0.058(0.043)\text{expvs.c1}_{c2} - 0.006(0.015)\text{c2vs.c1exp}.\text{time}_{c2} - 0.008(0.030)\text{expvs.c1}.\text{time}_{c2} \)
\( \beta_{\text{e}} = 0.059(0.037) + v_{\text{e}} + u_{\text{e}} + e_{\text{e}} \)
\[ \begin{bmatrix} v_{\text{e}} \\ u_{\text{e}} \\ e_{\text{e}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.001(0.003) \\ 0.256(0.033) \\ 0.365(0.027) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2246.363 (980 of 1716 cases in use)\]
Self-Efficacy: Model 3
\[ \text{sfe} \sim \mathcal{N}(\mathbf{X}, \Omega) \]
\[ \text{sfe}_{\text{ge}} = \beta_{\text{ge}} \times \text{cons} + 0.481(0.033) \times \text{te} + 0.027(0.027) \times \text{c1} + 0.032(0.031) \times \text{c1 vs. c2} + 0.016(0.020) \times \text{time ge} + 0.004(0.030) \times \text{te} \times \text{c1} + 0.021(0.032) \times \text{c1 vs. c2} + 0.001(0.025) \times \text{te} \times \text{time ge} - 0.015(0.021) \times \text{te} \times \text{c1} \times \text{time ge} + 0.067(0.024) \times \text{te} \times \text{c1 vs. c2} \times \text{time ge} \]
\[ \beta_{\text{ge}} = 0.089(0.038) + v_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [v_{\text{ge}}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.001(0.003) \end{bmatrix} \]

\[ [u_{\text{ge}}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.258(0.032) \end{bmatrix} \]

\[ [e_{\text{ge}}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.358(0.026) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2237.548 (980 of 1716 cases in use)

Stress Management: Model 1a
\[ \text{strs} \sim \mathcal{N}(\mathbf{X}, \Omega) \]
\[ \text{strs}_{\text{ge}} = \beta_{\text{ge}} \times \text{cons} \]
\[ \beta_{\text{ge}} = 0.094(0.034) + v_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [v_{\text{ge}}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.006(0.000) \end{bmatrix} \]

\[ [u_{\text{ge}}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.508(0.048) \end{bmatrix} \]

\[ [e_{\text{ge}}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.461(0.032) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 3063.266 (1139 of 1716 cases in use)

Stress Management: Model 1b
\[ \text{strs} \sim \mathcal{N}(\mathbf{X}, \Omega) \]
\[ \text{strs}_{\text{ge}} = \beta_{\text{ge}} \times \text{cons} \]
\[ \beta_{\text{ge}} = 0.075(0.031) + v_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]

\[ [v_{\text{ge}}] \sim \mathcal{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.006(0.000) \end{bmatrix} \]

\[ [u_{\text{ge}}] \sim \mathcal{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.258(0.035) \end{bmatrix} \]

\[ [e_{\text{ge}}] \sim \mathcal{N}(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.425(0.031) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2383.845 (979 of 1716 cases in use)
Stress Management: Model 2a
\[ \text{strmsng}_{pk} = \beta_{\text{cons}} + 0.516(0.031) \times \text{strmsng}_{pk} + 0.040(0.025) \times \text{time}_{pk} + 0.005(0.029) \times \text{expvs.c1c2}_{pk} + 0.044(0.034) \times \text{c1vs.c2}_{pk} + 0.022(0.020) \times \text{expvs.c1c2.time}_{pk} + 0.009(0.024) \times \text{c1vs.c2.time}_{pk} + \epsilon_{\text{strmsng}_{pk}} \]
\[ \beta_{\text{cons}} = 0.085(0.035) + v_{\text{strmsng}_{pk}} + u_{\text{strmsng}_{pk}} + \bar{\epsilon}_{\text{strmsng}_{pk}} \]
\[ [v_{\text{strmsng}_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{\text{strmsng}_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.292(0.037) \end{bmatrix} \]
\[ [\bar{\epsilon}_{\text{strmsng}_{pk}}] \sim N(0, \Omega_{\bar{\epsilon}}) : \Omega_{\bar{\epsilon}} = \begin{bmatrix} 0.418(0.030) \end{bmatrix} \]
-2*log(likelihood/IGLS Deviance) = 2375.694 (979 of 1716 cases in use)

Stress Management: Model 2b
\[ \text{strmsng}_{pk} = \beta_{\text{cons}} + 0.516(0.031) \times \text{strmsng}_{pk} + 0.040(0.025) \times \text{time}_{pk} + 0.019(0.022) \times \text{expvs.c1c2}_{pk} + 0.030(0.015) \times \text{expvs.c1c2.time}_{pk} + 0.038(0.034) \times \text{expvs.c1c2.time}_{pk} \]
\[ \beta_{\text{cons}} = 0.085(0.035) + v_{\text{strmsng}_{pk}} + u_{\text{strmsng}_{pk}} + \bar{\epsilon}_{\text{strmsng}_{pk}} \]
\[ [v_{\text{strmsng}_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{\text{strmsng}_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.292(0.037) \end{bmatrix} \]
\[ [\bar{\epsilon}_{\text{strmsng}_{pk}}] \sim N(0, \Omega_{\bar{\epsilon}}) : \Omega_{\bar{\epsilon}} = \begin{bmatrix} 0.418(0.030) \end{bmatrix} \]
-2*log(likelihood/IGLS Deviance) = 2375.694 (979 of 1716 cases in use)

Stress Management: Model 2c
\[ \text{strmsng}_{pk} = \beta_{\text{cons}} + 0.516(0.031) \times \text{strmsng}_{pk} + 0.040(0.025) \times \text{time}_{pk} + 0.025(0.023) \times \text{c1c2.exp}_{pk} + 0.014(0.046) \times \text{expvs.c1p}_{pk} + 0.016(0.016) \times \text{c1c2.expvs.c1p.time}_{pk} + 0.029(0.032) \times \text{expvs.c1p.time}_{pk} \]
\[ \beta_{\text{cons}} = 0.085(0.035) + v_{\text{strmsng}_{pk}} + u_{\text{strmsng}_{pk}} + \bar{\epsilon}_{\text{strmsng}_{pk}} \]
\[ [v_{\text{strmsng}_{pk}}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{\text{strmsng}_{pk}}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.292(0.037) \end{bmatrix} \]
\[ [\bar{\epsilon}_{\text{strmsng}_{pk}}] \sim N(0, \Omega_{\bar{\epsilon}}) : \Omega_{\bar{\epsilon}} = \begin{bmatrix} 0.418(0.030) \end{bmatrix} \]
-2*log(likelihood/IGLS Deviance) = 2375.694 (979 of 1716 cases in use)
Stress Management: Model 3
\[ \text{strang}_{pk} \sim N(\mathbf{X} \beta, \Omega) \]
\[ \text{strang}_{pk} = \beta_{q0} \text{cons} + 0.502(0.038) \text{trstrmg}_{pk} + 0.001(0.030) \text{expvs.c1c2}_{pk} + 0.041(0.033) \text{c1vs.c2}_{pk} + 0.053(0.022) \text{time}_{pk} + 0.016(0.033) \text{trstrmg.expvs.c1c2}_{pk} + 0.029(0.034) \text{trstrmg.c1vs.c2}_{pk} - 0.015(0.027) \text{trstrmg.time}_{pk} - 0.016(0.022) \text{trstrmg.expvs.c1c2.time}_{pk} + 0.009(0.025) \text{trstrmg.c1vs.c2.time}_{pk} \]
\[ \beta_{q0} = 0.091(0.036) + \nu_{qk} + u_{qk} + e_{qk} \]
\[ [\nu_{qk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.291(0.037) \end{bmatrix} \]
\[ [e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.418(0.030) \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 2375.128(979 of 1716 cases in use)\]

Open Thinking: Model 1a
\[ \text{opunkt}_{pk} \sim N(\mathbf{X} \beta, \Omega) \]
\[ \text{opunkt}_{pk} = \beta_{q0} \text{cons} \]
\[ \beta_{q0} = -0.101(0.035) + \nu_{qk} + u_{qk} + e_{qk} \]
\[ [\nu_{qk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.536(0.051) \end{bmatrix} \]
\[ [e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.505(0.035) \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 3153.438(1140 of 1716 cases in use)\]

Open Thinking: Model 1b
\[ \text{opunkt}_{pk} \sim N(\mathbf{X} \beta, \Omega) \]
\[ \text{opunkt}_{pk} = \beta_{q0} \text{cons} + 0.413(0.035) \text{tropunkt}_{pk} \]
\[ \beta_{q0} = -0.103(0.034) + \nu_{qk} + u_{qk} + e_{qk} \]
\[ [\nu_{qk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{qk}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.426(0.045) \end{bmatrix} \]
\[ [e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.423(0.031) \end{bmatrix} \]
\[-2*\text{loglikelihood (IGLS Deviance)} = 2515.312(980 of 1716 cases in use)\]
Open Thinking: Model 2a

\[ \text{optmnt}_{\text{g}\text{e}} = \beta_{\text{opt}_1}\text{cons} + 0.409(0.035)\times \text{optmnt}_{\text{g}\text{e}} + -0.026(0.025)\text{time}_{\text{g}\text{e}} + 0.064(0.033)\text{expvs.c1c2}_{\text{g}\text{e}} + 0.047(0.037)\text{c1vs.c2}_{\text{g}\text{e}} + -0.015(0.021)\text{expvs.c1c2.time}_{\text{g}\text{e}} + -0.008(0.025)\text{c1vs.c2.time}_{\text{g}\text{e}} \]

\[ \beta_{\text{opt}_1} = -0.062(0.039) + \upsilon_{\text{opt}_1} + \mu_{\text{opt}_1} + \epsilon_{\text{opt}_1} \]

\[ [\upsilon_{\text{opt}_1}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \end{bmatrix} \]

\[ [\mu_{\text{opt}_1}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.419 & 0.044 \end{bmatrix} \]

\[ [\epsilon_{\text{opt}_1}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.422 & 0.031 \end{bmatrix} \]

\(-2\cdot\text{log likelihood/IGLS Deviance} = 2507.855(980 of 1716 cases in use)\)

Open Thinking: Model 2b

\[ \text{optmnt}_{\text{g}\text{e}} = \beta_{\text{opt}_2}\text{cons} + 0.409(0.035)\times \text{optmnt}_{\text{g}\text{e}} + -0.026(0.025)\text{time}_{\text{g}\text{e}} + 0.056(0.024)\text{expvc2vs.c1}_{\text{g}\text{e}} + 0.073(0.053)\text{expvs.c2}_c + -0.011(0.016)\text{expvc2vs.c1.time}_{\text{g}\text{e}} + -0.013(0.034)\text{expvs.c2.time}_{\text{g}\text{e}} \]

\[ \beta_{\text{opt}_2} = -0.062(0.039) + \upsilon_{\text{opt}_2} + \mu_{\text{opt}_2} + \epsilon_{\text{opt}_2} \]

\[ [\upsilon_{\text{opt}_2}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \end{bmatrix} \]

\[ [\mu_{\text{opt}_2}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.419 & 0.044 \end{bmatrix} \]

\[ [\epsilon_{\text{opt}_2}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.422 & 0.031 \end{bmatrix} \]

\(-2\cdot\text{log likelihood/IGLS Deviance} = 2507.855(980 of 1716 cases in use)\)

Open Thinking: Model 2c

\[ \text{optmnt}_{\text{g}\text{e}} = \beta_{\text{opt}_3}\text{cons} + 0.409(0.035)\times \text{optmnt}_{\text{g}\text{e}} + -0.026(0.025)\text{time}_{\text{g}\text{e}} + -0.009(0.026)\text{c2vs.c1.exp}_{\text{g}\text{e}} + 0.120(0.051)\text{expvs.c1}_c + -0.003(0.021)\text{c2vs.c1.exp.time}_{\text{g}\text{e}} + -0.006(0.033)\text{expvs.c1.time}_{\text{g}\text{e}} \]

\[ \beta_{\text{opt}_3} = -0.062(0.039) + \upsilon_{\text{opt}_3} + \mu_{\text{opt}_3} + \epsilon_{\text{opt}_3} \]

\[ [\upsilon_{\text{opt}_3}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \end{bmatrix} \]

\[ [\mu_{\text{opt}_3}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.419 & 0.044 \end{bmatrix} \]

\[ [\epsilon_{\text{opt}_3}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.422 & 0.031 \end{bmatrix} \]

\(-2\cdot\text{log likelihood/IGLS Deviance} = 2507.855(980 of 1716 cases in use)\)

518
Open Thinking: Model 3

\[
opnmk_{qk} = \beta_{qk} \text{cons} + 0.372(0.042) lopnmk_{qk} + 0.080(0.033) \text{expvs.c1c2}_{qk} + 0.050(0.037) \text{c1vs.c2}_{qk} + \\
-0.014(0.023) \text{time}_{qk} + 0.0067(0.036) l1opnmk \text{expvs.c1c2}_{qk} + 0.015(0.037) l1opnmk \text{c1vs.c2}_{qk} + \\
0.017(0.027) l1opnmk \text{time}_{qk} + 0.021(0.022) l1opnmk \text{expvs.c1c2.time}_{qk} + \\
0.028(0.025) l1opnmk \text{c1vs.c2.time}_{qk} \]

\[
\beta_{qk} = -0.046(0.040) + \nu_{qk} + \mu_{qk} + e_{qk}
\]

\[
[\nu_{qk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
[\mu_{qk}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.418(0.044) \end{bmatrix}
\]

\[
[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.418(0.031) \end{bmatrix}
\]

\[-2\times\text{loglikelihood(IGLS Deviance)} = 2501.550(980 of 1716 cases in use)\]

Social Effectiveness: Model 1a

\[\text{social}_{qk} \sim N(X_{qk}, \Omega)\]

\[\text{social}_{qk} = \beta_{qk} \text{cons} + \nu_{qk} + \mu_{qk} + e_{qk}\]

\[
[\nu_{qk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
[\mu_{qk}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.552(0.052) \end{bmatrix}
\]

\[
[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.510(0.035) \end{bmatrix}
\]

\[-2\times\text{loglikelihood(IGLS Deviance)} = 3171.504(1139 of 1716 cases in use)\]

Social Effectiveness: Model 1b

\[\text{social}_{qk} \sim N(X_{qk}, \Omega)\]

\[\text{social}_{qk} = \beta_{qk} \text{cons} + 0.529(0.032) \text{social}_{qk} + \nu_{qk} + \mu_{qk} + e_{qk}\]

\[
[\nu_{qk}] \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.600(0.000) \end{bmatrix}
\]

\[
[\mu_{qk}] \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.299(0.041) \end{bmatrix}
\]

\[
[e_{qk}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.485(0.035) \end{bmatrix}
\]

\[-2\times\text{loglikelihood(IGLS Deviance)} = 2485.515(979 of 1716 cases in use)\]
Social Effectiveness: Model 2a
\[ \text{social}_{eg} \sim N(\beta_0 \text{cons} + 0.516(0.033) \text{tisocial}_{eg} + 0.019(0.027) \text{time}_{eg} + 0.075(0.031) \text{expvs.c1} \text{c2}_{eg} + -0.015(0.035) \text{c1 vs c2}_{eg} + -0.007(0.022) \text{expvs.c1} \text{c2} \text{time}_{eg} + 0.005(0.026) \text{c1 vs c2} \text{time}_{eg}, \sigma^2) \]
\[ \beta_{eg} = 0.022(0.036) + v_{eg} + u_{eg} + e_{eg} \]
\[ [v_{eg}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{eg}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.295(0.041) \end{bmatrix} \]
\[ [e_{eg}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.485(0.035) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 2478.172 (979 of 1716 cases in use)

Social Effectiveness: Model 2b
\[ \text{social}_{eg} \sim N(\beta_0 \text{cons} + 0.516(0.033) \text{tisocial}_{eg} + 0.019(0.027) \text{time}_{eg} + 0.030(0.023) \text{expvs.c1} \text{c2}_{eg} + 0.120(0.050) \text{expvs.c1} \text{c2} \text{time}_{eg} + -0.001(0.016) \text{expvs.c2} \text{c1} \text{time}_{eg} + -0.013(0.036) \text{expvs.c2} \text{time}_{eg}, \sigma^2) \]
\[ \beta_{eg} = 0.022(0.036) + v_{eg} + u_{eg} + e_{eg} \]
\[ [v_{eg}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{eg}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.295(0.041) \end{bmatrix} \]
\[ [e_{eg}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.485(0.035) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 2478.172 (979 of 1716 cases in use)

Social Effectiveness: Model 2c
\[ \text{social}_{eg} \sim N(\beta_0 \text{cons} + 0.516(0.033) \text{tisocial}_{eg} + 0.019(0.027) \text{time}_{eg} + 0.045(0.024) \text{c2} \text{c1} \text{exp}_{eg} + 0.105(0.048) \text{expvs.c1} \text{c2}_{eg} + -0.006(0.018) \text{c2} \text{c1} \text{exp} \text{time}_{eg} + -0.008(0.035) \text{expvs.c1} \text{time}_{eg}, \sigma^2) \]
\[ \beta_{eg} = 0.022(0.036) + v_{eg} + u_{eg} + e_{eg} \]
\[ [v_{eg}] \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [u_{eg}] \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.295(0.041) \end{bmatrix} \]
\[ [e_{eg}] \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.485(0.035) \end{bmatrix} \]
-2*loglikelihood (IGLS Deviance) = 2478.172 (979 of 1716 cases in use)
Social Effectiveness: Model 3
\[ \text{social}_{ek} \sim N(XB, \Omega) \]
\[ \text{social}_{ek} = \beta_{0ek}\text{cons} + 0.489(0.040)1\text{tsocial}_{ek} + 0.086(0.032)\text{expvs.c1c2}_{ek} - 0.021(0.035)1\text{vs.c2}_{ek} + \\ + 0.019(0.024)\text{time}_{ek} - 0.031(0.035)1\text{tsocial.expvs.c1c2}_{ek} + 0.054(0.035)1\text{tsocial.c1c2}_{ek} + \\ -0.011(0.028)1\text{tsocial.time}_{ek} - 0.003(0.024)1\text{tsocial.expvs.c1c2.time}_{ek} + \\ 0.052(0.027)1\text{tsocial.c1c2.time}_{ek} \]
\[ \beta_{0ek} = 0.034(0.038) + v_{0e} + u_{0e} + e_{0e} \]
\[ \begin{bmatrix} v_{0e} \\ u_{0e} \\ e_{0e} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \\ 0.293(0.041) \\ 0.480(0.035) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2469.611 (979 of 1716 cases in use)

Cooperative Teamwork: Model 1a
\[ \text{coteam}_{ek} \sim N(XB, \Omega) \]
\[ \text{coteam}_{ek} = \beta_{0ek}\text{cons} \]
\[ \beta_{0ek} = -0.145(0.036) + v_{0e} + u_{0e} + e_{0e} \]
\[ \begin{bmatrix} v_{0e} \\ u_{0e} \\ e_{0e} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \\ 0.619(0.053) \\ 0.458(0.032) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 3152.762 (1140 of 1716 cases in use)

Cooperative Teamwork: Model 1b
\[ \text{coteam}_{ek} \sim N(XB, \Omega) \]
\[ \text{coteam}_{ek} = \beta_{0ek}\text{cons} - 0.515(0.032)1\text{tcoteam}_{ek} \]
\[ \beta_{0ek} = -0.322(0.032) + v_{0e} + u_{0e} + e_{0e} \]
\[ \begin{bmatrix} v_{0e} \\ u_{0e} \\ e_{0e} \end{bmatrix} \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \\ 0.354(0.040) \\ 0.373(0.025) \end{bmatrix} \]

-2*loglikelihood(IGLS Deviance) = 2408.135 (980 of 1716 cases in use)
Cooperative Teamwork: Model 2a

coteam_{jk} \sim N(\mu, \Sigma) 

coteam_{jk} = \beta_{0}\text{cons} + 0.509(0.032)\text{c1coteam}_{jk} + -0.026(0.024)\text{time}_{jk} + 0.058(0.031)\text{expvs.c1c2}_{jk} + 
-0.012(0.035)\text{c1vs.c2}_{jk} + 0.007(0.020)\text{expvs.c1c2.time}_{jk} + -0.002(0.023)\text{c1vs.c2.time}_{jk} 

\beta_{0} = -0.106(0.037) + v_{0} + u_{0} + \epsilon_{0}

\begin{align*}
\left[ v_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
\left[ u_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.379(0.040) \end{bmatrix} \\
\left[ \epsilon_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.377(0.028) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2402.794 (980 of 1716 cases in use)

Cooperative Teamwork: Model 2b

coteam_{jk} \sim N(\mu, \Sigma) 

coteam_{jk} = \beta_{0}\text{cons} + 0.509(0.032)\text{c1coteam}_{jk} + -0.026(0.024)\text{time}_{jk} + 0.023(0.023)\text{expvs2vs.c1}_{jk} + 
0.093(0.051)\text{expvs.c2}_{jk} + 0.002(0.015)\text{expvs2vs.c1.time}_{jk} + 0.011(0.032)\text{expvs.c2.time}_{jk} 

\beta_{0} = -0.106(0.037) + v_{0} + u_{0} + \epsilon_{0}

\begin{align*}
\left[ v_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
\left[ u_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.379(0.040) \end{bmatrix} \\
\left[ \epsilon_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.377(0.028) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2402.794 (980 of 1716 cases in use)

Cooperative Teamwork: Model 2c

coteam_{jk} \sim N(\mu, \Sigma) 

coteam_{jk} = \beta_{0}\text{cons} + 0.509(0.032)\text{c1coteam}_{jk} + -0.026(0.024)\text{time}_{jk} + 0.025(0.023)\text{c2vs.c1exp}_{jk} + 
0.051(0.049)\text{expvs.c1}_{jk} + -0.004(0.016)\text{c2vs.c1exp.time}_{jk} + 0.009(0.031)\text{expvs.c1.time}_{jk} 

\beta_{0} = -0.106(0.037) + v_{0} + u_{0} + \epsilon_{0}

\begin{align*}
\left[ v_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
\left[ u_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.379(0.040) \end{bmatrix} \\
\left[ \epsilon_{0} \right] & \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.377(0.028) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2402.794 (980 of 1716 cases in use)
Cooperative Teamwork: Model 3

coteam_{gk} \sim \mathcal{N}(\Omega, \Omega)

coteam_{gk} = \beta_{0gk} + 0.485(0.035) \text{leads_clc}_{gk} + 0.061(0.031) \text{expvs.clc}_{gk} + 0.015(0.035) \text{c1vs.c2}_{gk} +
-0.036(0.021) \text{time}_{gk} - 0.016(0.032) \text{coteam.expvs.clc}_{gk} +
-0.067(0.035) \text{c1team.c1vs.c2}_{gk} + 0.004(0.024) \text{coteam.time}_{gk} +
0.040(0.019) \text{coteam.expvs.c1c2.time}_{gk} + 0.031(0.024) \text{c1team.c1vs.c2.time}_{gk}

\beta_{0gk} = -0.103(0.038) + \nu_{Ugk} + \nu_{Ugk} + \epsilon_{gk}

\begin{bmatrix}
v_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_g) : 
\begin{bmatrix}
0.000(0.000) \\
0.376(0.039) \\
0.371(0.027)
\end{bmatrix}

-2*\text{loglikelihood(IQLS Deviance)} = 2390.059 (980 of 1716 cases in use)

Leadership Ability: Model 1a

lead_{gk} \sim \mathcal{N}(\Omega, \Omega)

lead_{gk} = \beta_{0gk} + \nu_{gk} + \nu_{Ugk} + \epsilon_{gk}

\begin{bmatrix}
v_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_g) : 
\begin{bmatrix}
0.006(0.008) \\
0.488(0.039) \\
0.308(0.021)
\end{bmatrix}

-2*\text{loglikelihood(IQLS Deviance)} = 2782.657 (1140 of 1716 cases in use)

Leadership Ability: Model 1b

lead_{gk} \sim \mathcal{N}(\Omega, \Omega)

lead_{gk} = \beta_{0gk} + 0.52\beta_{0gk} \text{leads}_k + \nu_{gk} + \nu_{Ugk} + \epsilon_{gk}

\begin{bmatrix}
v_{gk} \\
u_{gk} \\
e_{gk}
\end{bmatrix}
\sim \mathcal{N}(0, \Omega_g) : 
\begin{bmatrix}
0.000(0.000) \\
0.230(0.028) \\
0.294(0.021)
\end{bmatrix}

-2*\text{loglikelihood(IQLS Deviance)} = 2069.836 (980 of 1716 cases in use)
Leadership Ability: Model 2a
\[ \text{lead}_{yk} \sim N(XB, \Omega) \]
\[ \text{lead}_{yk} = \beta_{3k}\text{cons} + 0.526(0.027)\times \text{lead}_{yk} + -0.033(0.021)\times \text{time}_{yk} + 0.066(0.025)\times \text{expvs.c1c2}_{yk} + 
-0.025(0.029)\times \text{c1vs.c2}_{yk} + -0.005(0.017)\times \text{expvs.c1c2.time}_{yk} + 0.008(0.020)\times \text{c1vs.c2.time}_{yk} \]
\[ \beta_{3k} = 0.042(0.030) + \nu_{3k} + u_{3k} + \epsilon_{3k} \]
\[ \nu_{3k} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \mu_{3k} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.225(0.027) \end{bmatrix} \]
\[ \epsilon_{3k} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.253(0.021) \end{bmatrix} \]
\[ -2\times \log(\text{likelihood (IGLS Deviance)}) = 2059.385(980 \text{ of } 1716 \text{ cases in use}) \]

Leadership Ability: Model 2b
\[ \text{lead}_{yk} \sim N(XB, \Omega) \]
\[ \text{lead}_{yk} = \beta_{3k}\text{cons} + 0.526(0.027)\times \text{lead}_{yk} + -0.033(0.021)\times \text{time}_{yk} + 0.020(0.019)\times \text{expsc2vs.c1}_{yk} + 
0.112(0.042)\times \text{expvs.c1c2}_{yk} + 0.002(0.013)\times \text{expsc2vs.c1.time}_{yk} + -0.011(0.028)\times \text{expvs.c1c2.time}_{yk} \]
\[ \beta_{3k} = 0.042(0.030) + \nu_{3k} + u_{3k} + \epsilon_{3k} \]
\[ \nu_{3k} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \mu_{3k} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.225(0.027) \end{bmatrix} \]
\[ \epsilon_{3k} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.293(0.021) \end{bmatrix} \]
\[ -2\times \log(\text{likelihood (IGLS Deviance)}) = 2059.385(980 \text{ of } 1716 \text{ cases in use}) \]

Leadership Ability: Model 2c
\[ \text{lead}_{yk} \sim N(XB, \Omega) \]
\[ \text{lead}_{yk} = \beta_{3k}\text{cons} + 0.526(0.027)\times \text{lead}_{yk} + -0.033(0.021)\times \text{time}_{yk} + -0.046(0.020)\times \text{c2vs.c1exp}_{yk} + 
0.088(0.040)\times \text{expvs.c1}_{yk} + 0.006(0.014)\times \text{c2vs.c1.exp.time}_{yk} + -0.003(0.027)\times \text{expvs.c1.time}_{yk} \]
\[ \beta_{3k} = 0.042(0.030) + \nu_{3k} + u_{3k} + \epsilon_{3k} \]
\[ \nu_{3k} \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \mu_{3k} \sim N(0, \Omega_{\mu}) : \Omega_{\mu} = \begin{bmatrix} 0.225(0.027) \end{bmatrix} \]
\[ \epsilon_{3k} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} 0.293(0.021) \end{bmatrix} \]
\[ -2\times \log(\text{likelihood (IGLS Deviance)}) = 2059.385(980 \text{ of } 1716 \text{ cases in use}) \]
Leadership Ability: Model 3

\[
\text{lead}_{p_k} \sim N(X \beta, \Omega)
\]

\[
\text{lead}_{p_k} = \beta_{p_k \text{cons}} + 0.470(0.03)\text{time}_{p_k} + 0.093(0.025)\text{exps}\cdot\text{clvs}_{2p_k} - 0.030(0.025)\text{clvs}_{2p_k} + 0.055(0.019)\text{time}_{p_k} - 0.067(0.032)\text{time}_{p_k} + 0.053(0.029)\text{time}_{p_k} + 0.010(0.020)\text{exps}\cdot\text{clvs}_{2p_k} + 0.022(0.021)\text{time}_{p_k} + 0.0072(0.032) + \nu_{p_k} + \mu_{p_k} + \epsilon_{p_k}
\]

\[
\begin{bmatrix}
\nu_{p_k} \\
\mu_{p_k} \\
\epsilon_{p_k}
\end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix}
0.000 & (0.000) \\
0.217 & (0.027) \\
0.294 & (0.021)
\end{bmatrix}
\]

\[-2\text{loglikelihood (IGLS Deviance)} = 2050.147(980 of 1716 cases in use)\]

Time Efficiency: Model 1a

\[
\text{timeeff}_{k} \sim N(X \beta, \Omega)
\]

\[
\text{timeeff}_{k} = \beta_{p_k \text{cons}} + \nu_{p_k} + \mu_{p_k} + \epsilon_{p_k}
\]

\[
\begin{bmatrix}
\nu_{p_k} \\
\mu_{p_k} \\
\epsilon_{p_k}
\end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix}
0.005 & (0.007) \\
0.592 & (0.049) \\
0.410 & (0.025)
\end{bmatrix}
\]

\[-2\text{loglikelihood (IGLS Deviance)} = 3059.244(1139 of 1716 cases in use)\]

Time Efficiency: Model 1b

\[
\text{timeeff}_{k} \sim N(X \beta, \Omega)
\]

\[
\text{timeeff}_{k} = \beta_{p_k \text{cons}} + 0.497(0.032)\text{timeeff}_{k}
\]

\[
\beta_{p_k} = 0.038(0.054) + \nu_{p_k} + \mu_{p_k} + \epsilon_{p_k}
\]

\[
\begin{bmatrix}
\nu_{p_k} \\
\mu_{p_k} \\
\epsilon_{p_k}
\end{bmatrix} \sim N(0, \Omega) \quad \Omega = \begin{bmatrix}
0.000 & (0.004) \\
0.372 & (0.040) \\
0.327 & (0.028)
\end{bmatrix}
\]

\[-2\text{loglikelihood (IGLS Deviance)} = 2397.283(979 of 1716 cases in use)\]
**Time Efficiency: Model 2a**
\[ \text{timeeff}_{cg} \sim N(xb, \Omega) \]
\[ \beta_{cg} = \beta_{cg \text{ cons}} + 0.494(0.032) \times \text{timeeff}_{cg} + 0.044(0.024) \times \text{c1c2}_{cg} + 0.018(0.031) \times \text{expvs.c1c2}_{cg} + 0.037(0.035) \times \text{c1vs.c2}_{cg} + 0.015(0.020) \times \text{expvs.c1c2.time}_{cg} + 0.016(0.023) \times \text{c1vs.c2.time}_{cg} \]
\[ \beta_{gc} = 0.075(0.037) + \eta_{gc} + \varepsilon_{gc} \]
\[ \begin{bmatrix} \eta_{gc} \\ \varepsilon_{gc} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.000(0.000) \\ 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} \eta_{cg} \\ \varepsilon_{cg} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.374(0.039) \\ 0.376(0.028) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2392.219 \text{ (979 of 1716 cases in use)} \]

**Time Efficiency: Model 2b**
\[ \text{timeeff}_{cg} \sim N(xb, \Omega) \]
\[ \beta_{cg} = \beta_{cg \text{ cons}} + 0.494(0.032) \times \text{timeeff}_{cg} + 0.044(0.024) \times \text{c1c2}_{cg} + 0.027(0.032) \times \text{expvs.c1c2}_{cg} + 0.008(0.030) \times \text{expvs.c2}_{cg} + 0.016(0.015) \times \text{expvs.c1c2.time}_{cg} + 0.015(0.022) \times \text{expvs.c2.time}_{cg} \]
\[ \beta_{gc} = 0.075(0.037) + \eta_{gc} + \varepsilon_{gc} \]
\[ \begin{bmatrix} \eta_{gc} \\ \varepsilon_{gc} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.000(0.000) \\ 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} \eta_{cg} \\ \varepsilon_{cg} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.374(0.039) \\ 0.376(0.028) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2392.219 \text{ (979 of 1716 cases in use)} \]

**Time Efficiency: Model 2c**
\[ \text{timeeff}_{cg} \sim N(xb, \Omega) \]
\[ \beta_{cg} = \beta_{cg \text{ cons}} + 0.494(0.032) \times \text{timeeff}_{cg} + 0.044(0.024) \times \text{c1c2}_{cg} + 0.010(0.024) \times \text{c1exp}_{cg} + 0.045(0.048) \times \text{expvs.c1}_{cg} + 0.060(0.026) \times \text{c2vs.c1exp.time}_{cg} + 0.031(0.031) \times \text{expvs.c1.time}_{cg} \]
\[ \beta_{gc} = 0.075(0.037) + \eta_{gc} + \varepsilon_{gc} \]
\[ \begin{bmatrix} \eta_{gc} \\ \varepsilon_{gc} \end{bmatrix} \sim N(0, \Omega_e) \quad \Omega_e = \begin{bmatrix} 0.000(0.000) \\ 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} \eta_{cg} \\ \varepsilon_{cg} \end{bmatrix} \sim N(0, \Omega_v) \quad \Omega_v = \begin{bmatrix} 0.374(0.039) \\ 0.376(0.028) \end{bmatrix} \]
\[-2 \times \text{loglikelihood(IGLS Deviance)} = 2392.218 \text{ (979 of 1716 cases in use)} \]
Time Efficiency: Model 3

timeeff_{gk} \sim N(\beta_0 + \beta_1 time, \Sigma)

\begin{align*}
\beta_0 &= \beta_{0g} + \beta_{0c} + 0.490(0.039)time_{gk} + 0.013(0.031)expvs.c1c2_{gk} + 0.033(0.035)clvs.c2_{gk} + \\
& \quad + 0.033(0.021)time_{gk} + 0.024(0.033)time_{gk} + 0.042(0.035)time_{gk} + \\
& -0.036(0.025)time_{gk} + 0.012(0.021)time_{gk} + \\
& 0.040(0.024)time_{gk} + 0.040(0.024)time_{gk}
\end{align*}

\begin{align*}
\beta_{gk} &= 0.072(0.037) + u_{gk} + v_{gk} + w_{gk}
\end{align*}

\begin{align*}
\begin{bmatrix}
\nu_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v)
\end{align*}

\begin{align*}
\sigma^2 &= 0.000(0.000)
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2382.700 (979 of 1716 cases in use)

Quality Seeking: Model 1a

defsk_{gk} \sim N(\beta_0 + \beta_1 defsk, \Sigma)

\begin{align*}
\beta_{gk} &= -0.252(0.038) + v_{gk} + w_{gk} + u_{gk}
\end{align*}

\begin{align*}
\begin{bmatrix}
v_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v)
\end{align*}

\begin{align*}
\sigma^2 &= 0.000(0.000)
\end{align*}

-2*loglikelihood(IGLS Deviance) = 3297.918 (1140 of 1716 cases in use)

Quality Seeking: Model 1b

defsk_{gk} \sim N(\beta_0 + \beta_1 defsk, \Sigma)

\begin{align*}
\beta_{gk} &= -0.258(0.034) + v_{gk} - u_{gk} + w_{gk}
\end{align*}

\begin{align*}
\begin{bmatrix}
v_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v) \\
\begin{bmatrix}
u_{gk}
\end{bmatrix} &~\sim N(0, \Omega_v)
\end{align*}

\begin{align*}
\sigma^2 &= 0.000(0.000)
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2584.309 (980 of 1716 cases in use)
Quality Seeking: Model 2a

\[ \text{qlysk}_{gk} \sim N(\mu, \Omega) \]

\[ \text{qlysk}_{gk} = \beta_0 + \beta_1 \text{cons} + 0.542(0.034) \text{qlysk}_{gk} + 0.017(0.027) \text{time}_{gk} + 0.081(0.032) \text{expvs.} c_{1} \text{c}_{2} + \]

\[ -0.002(0.035) \text{c}_{1} \text{vs.} c_{2} + -0.017(0.022) \text{expvs.} c_{1} \text{c}_{2}. \text{time}_{gk} + 0.015(0.027) \text{c}_{1} \text{vs.} c_{2}. \text{time}_{gk} \]

\[ \beta_{gk} = -0.213(0.059) + v_{gk} + \mu_{gk} + \epsilon_{gk} \]

\[
\begin{bmatrix}
    v_{gk} \\
    u_{gk} \\
    \epsilon_{gk}
\end{bmatrix}
\sim N(0, \Omega_v) \quad \Omega_v =
\begin{bmatrix}
    0.000(0.000) \\
    0.371(0.046) \\
    0.502(0.037)
\end{bmatrix}
\]

\[-2*\text{loglikelihood (IGLS Deviance)} = 2576.718(980 of 1716 cases in use)\]

Quality Seeking: Model 2b

\[ \text{qlysk}_{gk} \sim N(\mu, \Omega) \]

\[ \text{qlysk}_{gk} = \beta_0 + \beta_1 \text{cons} + 0.542(0.034) \text{qlysk}_{gk} + 0.017(0.027) \text{time}_{gk} + 0.040(0.024) \text{expve2vs.} c_{1} \text{c}_{2} + \]

\[ 0.123(0.053) \text{expvs.} c_{1} \text{c}_{2} + -0.017(0.027) \text{expve2vs.} c_{1}. \text{time}_{gk} + 0.053(0.037) \text{expvs.} c_{2}. \text{time}_{gk} \]

\[ \beta_{gk} = -0.213(0.059) + v_{gk} + \mu_{gk} + \epsilon_{gk} \]

\[
\begin{bmatrix}
    v_{gk} \\
    u_{gk} \\
    \epsilon_{gk}
\end{bmatrix}
\sim N(0, \Omega_v) \quad \Omega_v =
\begin{bmatrix}
    0.000(0.000) \\
    0.371(0.046) \\
    0.502(0.037)
\end{bmatrix}
\]

\[-2*\text{loglikelihood (IGLS Deviance)} = 2576.718(980 of 1716 cases in use)\]

Quality Seeking: Model 2c

\[ \text{qlysk}_{gk} \sim N(\mu, \Omega) \]

\[ \text{qlysk}_{gk} = \beta_0 + \beta_1 \text{cons} + 0.542(0.034) \text{qlysk}_{gk} + 0.017(0.027) \text{time}_{gk} + 0.042(0.026) \text{c2vs.} c_{1} \text{expa} + \]

\[ 0.123(0.053) \text{expvs.} c_{1} \text{c}_{2} + 0.016(0.018) \text{c2vs.} c_{1}. \text{expvs.} \text{c}_{1}. \text{time}_{gk} + -0.017(0.035) \text{expvs.} c_{1}. \text{time}_{gk} \]

\[ \beta_{gk} = -0.213(0.059) + v_{gk} + \mu_{gk} + \epsilon_{gk} \]

\[
\begin{bmatrix}
    v_{gk} \\
    u_{gk} \\
    \epsilon_{gk}
\end{bmatrix}
\sim N(0, \Omega_v) \quad \Omega_v =
\begin{bmatrix}
    0.000(0.000) \\
    0.371(0.046) \\
    0.502(0.037)
\end{bmatrix}
\]

\[-2*\text{loglikelihood (IGLS Deviance)} = 2576.718(980 of 1716 cases in use)\]
Quality Seeking: Model 3

\[
\text{qltysk}_{g\epsilon} \sim N(\beta_{q\epsilon}, \Omega)
\]

- \(\epsilon_{q_{\epsilon}} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} \epsilon_{q_{\epsilon}} \\ \epsilon_{r_{\epsilon}} \end{bmatrix}
\]

- \(u_{q_{\epsilon}} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.370(0.046) \\ 0.499(0.036) \end{bmatrix}
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 2571.504 (980 of 1716 cases in use)\]

Coping with Change: Model 1a

\text{cpech}_{g\epsilon} \sim N(\beta_{q\epsilon}, \Omega)

- \(\epsilon_{q_{\epsilon}} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} \epsilon_{q_{\epsilon}} \\ \epsilon_{r_{\epsilon}} \end{bmatrix}
\]

- \(u_{q_{\epsilon}} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.473(0.045) \\ 0.453(0.031) \end{bmatrix}
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 3018.347 (1138 of 1716 cases in use)\]

Coping with Change: Model 1b

\text{cpech}_{g\epsilon} \sim N(\beta_{q\epsilon}, \Omega)

- \(\epsilon_{q_{\epsilon}} \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = \begin{bmatrix} \epsilon_{q_{\epsilon}} \\ \epsilon_{r_{\epsilon}} \end{bmatrix}
\]

- \(u_{q_{\epsilon}} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.423(0.031) \\ 0.439(0.045) \end{bmatrix}
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 2377.942 (978 of 1716 cases in use)\]
Coping with Change: Model 2a

cpechg2c \sim N(\mu, \Omega)

cpechg2c = \beta_0 + \text{cons} + 0.456(0.031) \cdot \text{cpechg2c} + 0.003(0.025) \cdot \text{time}_{pe} + 0.026(0.029) \cdot \text{expvs.cl1c2}_{pe} + 0.004(0.034) \cdot \text{cl1vs.c2}_{pe} + 0.011(0.020) \cdot \text{expvs.cl1c2.time}_{pe} + 0.017(0.024) \cdot \text{cl1vs.c2.time}_{pe}

\beta_0 = 0.004(0.035) + v_{0c} + u_{0c} + e_{0c}

[v_{0c}] \sim N(0, \Omega_v) : \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\
\end{bmatrix}

[u_{0c}] \sim N(0, \Omega_u) : \quad \Omega_u = \begin{bmatrix} 0.290(0.037) \\
\end{bmatrix}

[e_{0c}] \sim N(0, \Omega_e) : \quad \Omega_e = \begin{bmatrix} 0.421(0.031) \\
\end{bmatrix}

-2*\text{loglikelihood(IGLS Deviance)} = 2376.391 (978 of 1716 cases in use)

Coping with Change: Model 2b

cpechg2c \sim N(\mu, \Omega)

cpechg2c = \beta_0 + \text{cons} + 0.456(0.031) \cdot \text{cpechg2c} + 0.003(0.025) \cdot \text{time}_{pe} + 0.015(0.022) \cdot \text{expvs2.cl1}_{pe} + 0.037(0.048) \cdot \text{expvs2.cl2}_{pe} + 0.014(0.015) \cdot \text{expvs2.cl1.time}_{pe} + 0.008(0.034) \cdot \text{expvs2.cl2.time}_{pe}

\beta_0 = 0.004(0.035) + v_{0c} + u_{0c} + e_{0c}

[v_{0c}] \sim N(0, \Omega_v) : \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\
\end{bmatrix}

[u_{0c}] \sim N(0, \Omega_u) : \quad \Omega_u = \begin{bmatrix} 0.290(0.037) \\
\end{bmatrix}

[e_{0c}] \sim N(0, \Omega_e) : \quad \Omega_e = \begin{bmatrix} 0.421(0.031) \\
\end{bmatrix}

-2*\text{loglikelihood(IGLS Deviance)} = 2376.391 (978 of 1716 cases in use)

Coping with Change: Model 2c

cpechg2c \sim N(\mu, \Omega)

cpechg2c = \beta_0 + \text{cons} + 0.456(0.031) \cdot \text{cpechg2c} + 0.003(0.025) \cdot \text{time}_{pe} - 0.011(0.023) \cdot \text{c2vs.cl1}_{pe} + 0.034(0.046) \cdot \text{expvs.cl1}_{pe} - 0.008(0.046) \cdot \text{c2vs.cl1.expvs}_{pe} - 0.025(0.052) \cdot \text{expvs.cl1.time}_{pe}

\beta_0 = 0.004(0.035) + v_{0c} + u_{0c} + e_{0c}

[v_{0c}] \sim N(0, \Omega_v) : \quad \Omega_v = \begin{bmatrix} 0.000(0.000) \\
\end{bmatrix}

[u_{0c}] \sim N(0, \Omega_u) : \quad \Omega_u = \begin{bmatrix} 0.290(0.037) \\
\end{bmatrix}

[e_{0c}] \sim N(0, \Omega_e) : \quad \Omega_e = \begin{bmatrix} 0.421(0.031) \\
\end{bmatrix}

-2*\text{loglikelihood(IGLS Deviance)} = 2376.391 (978 of 1716 cases in use)

530
Coping with Change: Model 3

cpechg_{gc} \sim N(\text{XB}, \Omega)

cpechg_{gc} = \beta_{gc} + 0.438(0.039)t1cpechg_{gc} + 0.030(0.030)expvs.c1c2.g + 0.000(0.033)clvs.c2.g + 0.009(0.036)+v_{gc} + u_{gc} + e_{gc}

\begin{align*}
\beta_{gc} &= 0.000(0.000) \\
\eta_{gc} &\sim N(0, \Omega_\eta) : \Omega_\eta = \begin{bmatrix} 0.290(0.037) \\
0.420(0.031) \end{bmatrix} \\
e_{gc} &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.200(0.000) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2374.306(978 of 1716 cases in use)

Active Involvement: Model 1a

actinv_{gc} \sim N(\text{XB}, \Omega)

actinv_{gc} = \beta_{gc} + 0.394(0.039)t1actinv_{gc} + v_{gc} + u_{gc} + e_{gc}

\begin{align*}
\beta_{gc} &= -0.096(0.034) + v_{gc} + u_{gc} + e_{gc} \\
\eta_{gc} &\sim N(0, \Omega_\eta) : \Omega_\eta = \begin{bmatrix} 0.000(0.000) \\
0.551(0.046) \end{bmatrix} \\
e_{gc} &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.415(0.028) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 3014.652(1140 of 1716 cases in use)

Active Involvement: Model 1b

actinv_{gc} \sim N(\text{XB}, \Omega)

actinv_{gc} = \beta_{gc} + 0.563(0.029)t1actinv_{gc} + v_{gc} + u_{gc} + e_{gc}

\begin{align*}
\beta_{gc} &= -0.115(0.029) + v_{gc} + u_{gc} + e_{gc} \\
\eta_{gc} &\sim N(0, \Omega_\eta) : \Omega_\eta = \begin{bmatrix} 0.060(0.000) \\
0.246(0.031) \end{bmatrix} \\
e_{gc} &\sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.391(0.028) \end{bmatrix}
\end{align*}

-2*loglikelihood(IGLS Deviance) = 2280.346(980 of 1716 cases in use)
Active Involvement: Model 2a
\[
\begin{align*}
\text{actinv}_{rg} &\sim N(\mu, \Omega) \\
\text{actinv}_{rg} &= \beta_{\text{actinv}} \text{cons} + 0.559(0.029) \times \text{actinv}_{rg} + -0.023(0.024) \times \text{time}_{rg} + 0.045(0.027) \times \text{exps}.c1 + c2 + \\
&- 0.043(0.032) \times \text{exps}.c1 + c2 + -0.012(0.020) \times \text{exps}.c1 + c2 + 0.034(0.023) \times \text{exps}.c1 + c2 + \text{time}_{rg}\end{align*}
\]
\[
\beta_{\text{actinv}} = -0.099(0.033) + v_{\text{actinv}} + u_{\text{actinv}} + e_{\text{actinv}}
\]
\[
\begin{bmatrix}
\mu_{\text{actinv}} \\
\mu_{u_{\text{actinv}}} \\
\mu_{e_{\text{actinv}}}
\end{bmatrix} \sim N(0, \Omega_{\text{actinv}}): \quad \Omega_{\text{actinv}} =
\begin{bmatrix}
0.000(0.000) & 0.000(0.000) & 0.000(0.000) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031)
\end{bmatrix}
\]
\[
-2\times \text{log likelihood (GLS Deviance)} = 2272.455(980 of 1716 cases in use)
\]

Active Involvement: Model 2b
\[
\begin{align*}
\text{actinv}_{rg} &\sim N(\mu, \Omega) \\
\text{actinv}_{rg} &= \beta_{\text{actinv}} \text{cons} + 0.559(0.029) \times \text{actinv}_{rg} + -0.023(0.024) \times \text{time}_{rg} + 0.016(0.020) \times \text{exps}.c1 + c2 + \\
&+ 0.016(0.016) \times \text{exps}.c1 + c2 + 0.016(0.016) \times \text{exps}.c1 + c2 + 0.016(0.016) \times \text{exps}.c1 + c2 + \text{time}_{rg}\end{align*}
\]
\[
\beta_{\text{actinv}} = -0.099(0.033) + v_{\text{actinv}} + u_{\text{actinv}} + e_{\text{actinv}}
\]
\[
\begin{bmatrix}
\mu_{\text{actinv}} \\
\mu_{u_{\text{actinv}}} \\
\mu_{e_{\text{actinv}}}
\end{bmatrix} \sim N(0, \Omega_{\text{actinv}}): \quad \Omega_{\text{actinv}} =
\begin{bmatrix}
0.000(0.000) & 0.000(0.000) & 0.000(0.000) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031)
\end{bmatrix}
\]
\[
-2\times \text{log likelihood (GLS Deviance)} = 2272.455(980 of 1716 cases in use)
\]

Active Involvement: Model 2c
\[
\begin{align*}
\text{actinv}_{rg} &\sim N(\mu, \Omega) \\
\text{actinv}_{rg} &= \beta_{\text{actinv}} \text{cons} + 0.559(0.029) \times \text{actinv}_{rg} + -0.023(0.024) \times \text{time}_{rg} + -0.029(0.022) \times \text{exps}.c1 + c2 + \\
&+ 0.024(0.023) \times \text{exps}.c1 + c2 + 0.024(0.023) \times \text{exps}.c1 + c2 + 0.024(0.023) \times \text{exps}.c1 + c2 + \text{time}_{rg}\end{align*}
\]
\[
\beta_{\text{actinv}} = -0.099(0.033) + v_{\text{actinv}} + u_{\text{actinv}} + e_{\text{actinv}}
\]
\[
\begin{bmatrix}
\mu_{\text{actinv}} \\
\mu_{u_{\text{actinv}}} \\
\mu_{e_{\text{actinv}}}
\end{bmatrix} \sim N(0, \Omega_{\text{actinv}}): \quad \Omega_{\text{actinv}} =
\begin{bmatrix}
0.000(0.000) & 0.000(0.000) & 0.000(0.000) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031) \\
0.244(0.031) & 0.244(0.031) & 0.244(0.031)
\end{bmatrix}
\]
\[
-2\times \text{log likelihood (GLS Deviance)} = 2272.455(980 of 1716 cases in use)
\]
Active Involvement: Model 3
\[ \text{actinv}_{gk} \sim N(\mu_{gk}, \Omega) \]

\[ \text{actinv}_{gk} = \beta_{gk1} \text{cons} + 0.585(0.039)\text{lactinv}_{gk} + 0.039(0.028)\expv_{c1c2}_{gk} + -0.019(0.031)\text{c1c2}_{gk} + \\
    -0.031(0.021)\text{time}_{gk} + 0.029(0.035)\text{lactinv}.\expv_{c1c2}_{gk} + -0.009(0.031)\text{lactinv}.\text{c1c2}_{gk} + \\
    0.014(0.027)\text{lactinv}.\text{time}_{gk} + -0.007(0.023)\text{lactinv}.\expv_{c1c2}.\text{time}_{gk} + \\
    -0.008(0.024)\text{lactinv}.\text{c1c2}.\text{time}_{gk} \]

\[ \beta_{gk1} = -0.106(0.034) + \gamma_{gk} + u_{gk} + e_{gk} \]

\[ \gamma_{gk} \sim N(0, \Omega_{\gamma}) : \Omega_{\gamma} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ u_{gk} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.244(0.033) \end{bmatrix} \]

\[ e_{gk} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.388(0.028) \end{bmatrix} \]

\(-2*\text{loglikelihood(IGLS Deviance)} = 2273.438(980 of 1716 cases in use)\)

Overall Effectiveness: Model 1a
\[ \text{overref}_{gk} \sim N(\mu_{gk}, \Omega) \]

\[ \text{overref}_{gk} = \beta_{gk1} \text{cons} \]

\[ \beta_{gk1} = -0.727(0.035) + \gamma_{gk} + u_{gk} + e_{gk} \]

\[ \gamma_{gk} \sim N(0, \Omega_{\gamma}) : \Omega_{\gamma} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ u_{gk} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.593(0.050) \end{bmatrix} \]

\[ e_{gk} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.420(0.029) \end{bmatrix} \]

\(-2*\text{loglikelihood(IGLS Deviance)} = 3072.613(1139 of 1716 cases in use)\)

Overall Effectiveness: Model 1b
\[ \text{overref}_{gk} \sim N(\mu_{gk}, \Omega) \]

\[ \text{overref}_{gk} = \beta_{gk1} \text{cons} + 0.548(0.032)\text{overref}_{gk} \]

\[ \beta_{gk1} = -0.315(0.029) + \gamma_{gk} + u_{gk} + e_{gk} \]

\[ \gamma_{gk} \sim N(0, \Omega_{\gamma}) : \Omega_{\gamma} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]

\[ u_{gk} \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.351(0.038) \end{bmatrix} \]

\[ e_{gk} \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.362(0.027) \end{bmatrix} \]

\(-2*\text{loglikelihood(IGLS Deviance)} = 2347.382(979 of 1716 cases in use)\)

533
Overall Effectiveness: Model 2a
\[ \text{overref}_{g \kappa} \sim N(\Xi \beta, \Omega) \]
\[ \text{overref}_{g \kappa} = \beta_{\text{cons}} + 0.542(0.032) \times \text{overref}_{g \kappa} + 0.043(0.023) \times \text{time}_{g \kappa} + 0.057(0.030) \times \text{expvs.c1} \times \text{c2} + 
-0.009(0.034) \times \text{cl} \times \text{c2} + 0.000(0.019) \times \text{expvs.c3} \times \text{c2} \times \text{time}_{g \kappa} + 
-0.006(0.023) \times \text{cl} \times \text{c2} \times \text{time}_{g \kappa} \]
\[ \beta_{g \kappa} = -0.281(0.042) + \eta_{g \kappa} + \epsilon_{g \kappa} \]
\[ [\eta_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.000(0.000)] \]
\[ [\epsilon_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.358(0.026)] \]
\[-2*\text{loglikelihood(GLS Deviance)} = 2339.058(979 of 1716 cases in use)\]

Overall Effectiveness: Model 2b
\[ \text{overref}_{g \kappa} \sim N(\Xi \beta, \Omega) \]
\[ \text{overref}_{g \kappa} = \beta_{\text{cons}} + 0.542(0.032) \times \text{overref}_{g \kappa} + 0.043(0.023) \times \text{time}_{g \kappa} + 0.024(0.022) \times \text{expvs.c2} \times \text{c1} + 
0.090(0.049) \times \text{expvs.c2} \times \text{c1} \times \text{time}_{g \kappa} + 
-0.003(0.014) \times \text{expvs.c2} \times \text{c1} \times \text{time}_{g \kappa} + 
0.003(0.031) \times \text{expvs.c2} \times \text{c1} \times \text{time}_{g \kappa} \]
\[ \beta_{g \kappa} = -0.281(0.042) + \eta_{g \kappa} + \epsilon_{g \kappa} \]
\[ [\eta_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.000(0.000)] \]
\[ [\epsilon_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.358(0.026)] \]
\[-2*\text{loglikelihood(GLS Deviance)} = 2339.058(979 of 1716 cases in use)\]

Overall Effectiveness: Model 2c
\[ \text{overref}_{g \kappa} \sim N(\Xi \beta, \Omega) \]
\[ \text{overref}_{g \kappa} = \beta_{\text{cons}} + 0.542(0.032) \times \text{overref}_{g \kappa} + 0.043(0.023) \times \text{time}_{g \kappa} + 0.024(0.022) \times \text{c2} \times \text{c1} \times \text{expvs.c1} + 
0.052(0.047) \times \text{expvs.c1} \times \text{c1} \times \text{time}_{g \kappa} + 
-0.005(0.015) \times \text{c2} \times \text{c1} \times \text{expvs.c1} \times \text{time}_{g \kappa} + 
-0.002(0.030) \times \text{expvs.c1} \times \text{c1} \times \text{time}_{g \kappa} \]
\[ \beta_{g \kappa} = -0.281(0.042) + \eta_{g \kappa} + \epsilon_{g \kappa} \]
\[ [\eta_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.000(0.000)] \]
\[ [\epsilon_{g \kappa}] \sim N(0, \Omega_{\epsilon}) : \Omega_{\epsilon} = [0.358(0.026)] \]
\[-2*\text{loglikelihood(GLS Deviance)} = 2339.058(979 of 1716 cases in use)\]

534
Overall Effectiveness: Model 3

\[ \text{overef}_{pgk} \sim \text{N}(\beta_{pgk} \text{cons} + 0.552(0.041) \text{time}_{pgk} + 0.077(0.035) \text{expvs.clic2}_{pgk} + -0.053(0.043) \text{c1vs.c2}_{pgk} + \\
0.014(0.026) \text{time}_{pgk} + 0.039(0.036) \text{time}_{pgk} + -0.060(0.034) \text{time}_{pgk} + -0.039(0.026) \text{time}_{pgk} + 0.001(0.019) \text{time}_{pgk} + \\
0.002(0.019) \text{time}_{pgk} \),} \]

\[ \beta_{pgk} = -0.280(0.043) + v_{pgk} + u_{pgk} + \epsilon_{pgk} \]

\[
\begin{align*}
[v_{pgk}] & \sim \text{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
[u_{pgk}] & \sim \text{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.349(0.037) \end{bmatrix} \\
[\epsilon_{pgk}] & \sim \text{N}(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.354(0.026) \end{bmatrix} 
\end{align*}
\]

\(-2*\text{loglikelihood} = 2331.483\) (979 of 1716 cases in use)

CSI

Problem Solve: Model 1

\[ \text{prbsol}_{pgk} \sim \text{N}(\beta_{pgk} \text{cons}) \]

\[ \beta_{pgk} = 0.001(0.046) + v_{pgk} + u_{pgk} + \epsilon_{pgk} \]

\[
\begin{align*}
[v_{pgk}] & \sim \text{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.002(0.005) \end{bmatrix} \\
[u_{pgk}] & \sim \text{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.667(0.057) \end{bmatrix} \\
[\epsilon_{pgk}] & \sim \text{N}(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.445(0.032) \end{bmatrix} 
\end{align*}
\]

\(-2*\text{loglikelihood} = 3030.090\) (1082 of 1716 cases in use)

Problem Solve: Model 1b

\[ \text{prbsol}_{pgk} \sim \text{N}(\beta_{pgk} \text{cons}) \]

\[ \beta_{pgk} = 0.015(0.025) + v_{pgk} + u_{pgk} + \epsilon_{pgk} \]

\[
\begin{align*}
[v_{pgk}] & \sim \text{N}(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\
[u_{pgk}] & \sim \text{N}(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.441(0.046) \end{bmatrix} \\
[\epsilon_{pgk}] & \sim \text{N}(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.408(0.031) \end{bmatrix} 
\end{align*}
\]

\(-2*\text{loglikelihood} = 2363.434\) (923 of 1716 cases in use)
Problem Solve: Model 2a
\[ \text{prbsol} = \beta_0 + \beta_1 \times \text{cons} + 0.523(0.035) \times \text{prbsol} + 0.037(0.025) \times \text{time} + 0.020(0.034) \times \text{expvs.c1} + \\
-0.019(0.021) \times \text{1vs.c2} + 0.021(0.021) \times \text{expvs.c1} + 0.012(0.025) \times \text{1vs.c2} \times \text{time} \]
\[ \beta_0 = 0.029(0.040) + \nu_0 + \eta_0 + \epsilon_0 \]
\[ [\nu_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [\eta_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.446(0.046) \end{bmatrix} \]
\[ [\epsilon_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.403(0.031) \end{bmatrix} \]
-2*loglikelihood/IGLS Deviance = 2360.498 (923 of 1716 cases in use)

Problem Solve: Model 2b
\[ \text{prbsol} = \beta_0 + \beta_1 \times \text{cons} + 0.523(0.035) \times \text{prbsol} + 0.037(0.025) \times \text{time} + 0.020(0.034) \times \text{expvs.c1} + \\
0.039(0.055) \times \text{expvs.c2} + 0.012(0.016) \times \text{expvs.c1} \times \text{time} + 0.025(0.035) \times \text{expvs.c2} \times \text{time} \]
\[ \beta_0 = 0.029(0.040) + \nu_0 + \eta_0 + \epsilon_0 \]
\[ [\nu_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [\eta_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.446(0.046) \end{bmatrix} \]
\[ [\epsilon_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.403(0.031) \end{bmatrix} \]
-2*loglikelihood/IGLS Deviance = 2360.499 (923 of 1716 cases in use)

Problem Solve: Model 2c
\[ \text{prbsol} = \beta_0 + \beta_1 \times \text{cons} + 0.523(0.035) \times \text{prbsol} + 0.037(0.025) \times \text{time} + 0.020(0.034) \times \text{expvs.c1} + \\
-0.019(0.021) \times \text{1vs.c2} \times \text{expvs.c1} + 0.021(0.021) \times \text{1vs.c2} \times \text{expvs.c1} \times \text{time} \]
\[ \beta_0 = 0.029(0.040) + \nu_0 + \eta_0 + \epsilon_0 \]
\[ [\nu_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ [\eta_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.446(0.046) \end{bmatrix} \]
\[ [\epsilon_0] \sim N(0, \Omega_0) : \Omega_0 = \begin{bmatrix} 0.403(0.031) \end{bmatrix} \]
-2*loglikelihood/IGLS Deviance = 2360.498 (923 of 1716 cases in use)
Problem Solve: Model 3
\[ \text{prbsol}_{gk} \sim N(IS, \Omega) \]
\[ \text{prbsol}_{gk} = \beta_{gk, \text{cons}} + 0.514(0.040) \times \text{prbsol}_{gk} + 0.017(0.034) \times \text{expvs.clic2}_{gk} + -0.025(0.038) \times \text{c1vs.c2}_{gk} + 0.026(0.023) \times \text{time}_{gk} + 0.006(0.033) \times \text{prbsol.clic2}_{gk} + -0.104(0.039) \times \text{prbsol.c1vs.c2}_{gk} + 0.014(0.025) \times \text{prbsol.time}_{gk} + -0.002(0.021) \times \text{prbsol.expvs.clic2.time}_{gk} + -0.021(0.026) \times \text{prbsol.c1vs.c2.time}_{gk} \]
\[ \beta_{gk} = 0.027(0.040) + v_{1g} + u_{0g} + e_{0g} \]

\[
\begin{bmatrix}
  v_{1g} \\
  u_{0g} \\
  e_{0g}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
  0.000(0.000) \\
  0.436(0.046) \\
  0.404(0.031)
\end{bmatrix}
\]

\[ -2*\text{loglikelihood (IGLS Deviance)} = 2353.847(923 of 1716 cases in use) \]

Support Seek: Model 1
\[ \text{supsek}_{gk} \sim N(IS, \Omega) \]
\[ \text{supsek}_{gk} = \beta_{gk, \text{cons}} \]
\[ \beta_{gk} = -0.006(0.080) + v_{1g} + u_{0g} + e_{0g} \]

\[
\begin{bmatrix}
  v_{1g} \\
  u_{0g} \\
  e_{0g}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
  0.015(0.016) \\
  0.563(0.048) \\
  0.365(0.026)
\end{bmatrix}
\]

\[ -2*\text{loglikelihood (IGLS Deviance)} = 2820.218(1082 of 1716 cases in use) \]

Support Seek: Model 1b
\[ \text{supsek}_{gk} \sim N(IS, \Omega) \]
\[ \text{supsek}_{gk} = \beta_{gk, \text{cons}} + 0.515(0.029) \times \text{supsek}_{gk} \]
\[ \beta_{1g} = 0.037(0.029) + v_{1g} + u_{0g} + e_{0g} \]

\[
\begin{bmatrix}
  v_{1g} \\
  u_{0g} \\
  e_{0g}
\end{bmatrix}
\sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix}
  0.000(0.000) \\
  0.268(0.034) \\
  0.354(0.027)
\end{bmatrix}
\]

\[ -2*\text{loglikelihood (IGLS Deviance)} = 2113.385(923 of 1716 cases in use) \]
Support Seek: Model 2a
\[
\text{support} = \beta_0 + \beta_1 \text{time} + \beta_2 \text{exps} + \beta_3 \text{c1} \times \text{c2} + \beta_4 \text{c1} \times \text{c2} \times \text{time} + \epsilon
\]
\[
\beta_0 = \{0.062, 0.034\}, \ \beta_1 = \{0.004, 0.024\}, \ \beta_2 = \{0.035, 0.028\}, \ \beta_3 = \{0.012, 0.021\}, \ \beta_4 = \{-0.015, 0.019\}, \ \epsilon = \{0.031, 0.023\}
\]
\[
\begin{bmatrix} v_{i0} \\ u_{i0} \\ e_{i0} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.265 \end{bmatrix}
\]
\[-2\times \text{loglikelihood(IGLS Deviance)} = 2108.044(923 of 1716 cases in use)\]

Support Seek: Model 2b
\[
\text{support} = \beta_0 + \beta_1 \text{time} + \beta_2 \text{exps} + \beta_3 \text{c1} \times \text{c2} + \beta_4 \text{c1} \times \text{c2} \times \text{time} + \epsilon
\]
\[
\beta_0 = \{0.062, 0.034\}, \ \beta_1 = \{0.004, 0.024\}, \ \beta_2 = \{0.035, 0.028\}, \ \beta_3 = \{0.012, 0.021\}, \ \beta_4 = \{-0.015, 0.019\}, \ \epsilon = \{0.031, 0.023\}
\]
\[
\begin{bmatrix} v_{i0} \\ u_{i0} \\ e_{i0} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.265 \end{bmatrix}
\]
\[-2\times \text{loglikelihood(IGLS Deviance)} = 2108.044(923 of 1716 cases in use)\]

Support Seek: Model 2c
\[
\text{support} = \beta_0 + \beta_1 \text{time} + \beta_2 \text{exps} + \beta_3 \text{c1} \times \text{c2} + \beta_4 \text{c1} \times \text{c2} \times \text{time} + \epsilon
\]
\[
\beta_0 = \{0.062, 0.034\}, \ \beta_1 = \{0.004, 0.024\}, \ \beta_2 = \{0.035, 0.028\}, \ \beta_3 = \{0.012, 0.021\}, \ \beta_4 = \{-0.015, 0.019\}, \ \epsilon = \{0.031, 0.023\}
\]
\[
\begin{bmatrix} v_{i0} \\ u_{i0} \\ e_{i0} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.265 \end{bmatrix}
\]
\[-2\times \text{loglikelihood(IGLS Deviance)} = 2108.044(923 of 1716 cases in use)\]
Support Seek: Model 3
\[
\text{supseek}_{gk} \sim N(\beta_0 + \beta_{0g} \text{cons}, \Omega_g)
\]
\[
\beta_{0g} = \beta_{0g\text{cons}} + 0.559(0.035) + \text{t1supseek}_{gk} + 0.036(0.029) + \text{expvs.clc2}_{ck} + 0.015(0.032) + \text{c1vs.c2}_{ck} + 0.022(0.021) + \text{time}_{gk} + 0.014(0.029) + \text{t1supseek.clc2}_{ck} + -0.048(0.032) + \text{t1supseek.c1vs.c2}_{ck} + -0.035(0.024) + \text{t1supseek.time}_{gk} + -0.031(0.020) + \text{t1supseek.expvs.clc2.time}_{gk} + -0.029(0.023) + \text{t1supseek.clc2.time}_{gk}
\]
\[
\begin{bmatrix}
\varepsilon_{gk} \\
\mu_{gk} \\
\zeta_{gk}
\end{bmatrix} \sim N(0, \Omega_g)
\]
\[
\begin{bmatrix}
\mu_{gk} \\
\varepsilon_{gk}
\end{bmatrix} \sim N(0, \Omega_u)
\]
\[
\begin{bmatrix}
\varepsilon_{gk}
\end{bmatrix} \sim N(0, \Omega_e)
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 2103.681 \text{(923 of 1716 cases in use)}\]

Avoidance: Model 1
\[
\text{avoid}_{gk} \sim N(\beta_0 + \beta_{0g} \text{cons}, \Omega_g)
\]
\[
\beta_{0g} = 0.149(0.039) + v_{gk} + u_{gk} + \varepsilon_{gk}
\]
\[
\begin{bmatrix}
\varepsilon_{gk}
\end{bmatrix} \sim N(0, \Omega_e)
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 3144.397 \text{(1082 of 1716 cases in use)}\]

Avoidance: Model 1b
\[
\text{avoid}_{gk} \sim N(\beta_0 + \beta_{0g} \text{cons} + 0.559(0.036) + \text{t1avoid}_{gk}, \Omega_g)
\]
\[
\beta_{0g} = 0.147(0.036) + v_{gk} + u_{gk} + \varepsilon_{gk}
\]
\[
\begin{bmatrix}
\varepsilon_{gk}
\end{bmatrix} \sim N(0, \Omega_e)
\]

\[-2\times \text{loglikelihood (IGLS Deviance)} = 2476.866 \text{(923 of 1716 cases in use)}\]

539
Avoidance: Model 2a

\[ \text{avoid} \sim N(\mu, \Omega) \]

\[
\text{avoid} = \beta_0 + \text{cons} + 0.546(0.036) \times \text{avoid} + -0.039(0.029) \times \text{time} + -0.051(0.034) \times \text{expvs.c1} + 0.046(0.039) \times \text{c1v.s.c2} + 0.014(0.024) \times \text{expvs.c1c2} + -0.057(0.029) \times \text{c1v.s.c2.time}.
\]

\[
\beta_0 = 0.119(0.041) + \nu \times \text{cons} + u \times \text{time} + \epsilon \times \text{expvs.c1}.
\]

\[
[\nu] \sim N(0, \Omega_\nu), \quad \Omega_\nu = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
[u] \sim N(0, \Omega_u), \quad \Omega_u = \begin{bmatrix} 0.381(0.050) \end{bmatrix}
\]

\[
[\epsilon] \sim N(0, \Omega_\epsilon), \quad \Omega_\epsilon = \begin{bmatrix} 0.528(0.040) \end{bmatrix}
\]

\[-2\text{loglikelihood} = 2466.822(923 of 1716 cases in use)\]

Avoidance: Model 2b

\[ \text{avoid} \sim N(\mu, \Omega) \]

\[
\text{avoid} = \beta_0 + \text{cons} + 0.546(0.036) \times \text{avoid} + -0.039(0.029) \times \text{time} + -0.051(0.034) \times \text{expvs.c1} + -0.056(0.036) \times \text{expvs.c2} + -0.012(0.018) \times \text{expvs.c1c2} + -0.021(0.029) \times \text{expvs.c1} \times \text{time} + -0.050(0.039) \times \text{expvs.c2 \times time}.
\]

\[
\beta_0 = 0.119(0.041) + \nu \times \text{cons} + u \times \text{time} + \epsilon \times \text{expvs.c1}.
\]

\[
[\nu] \sim N(0, \Omega_\nu), \quad \Omega_\nu = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
[u] \sim N(0, \Omega_u), \quad \Omega_u = \begin{bmatrix} 0.381(0.050) \end{bmatrix}
\]

\[
[\epsilon] \sim N(0, \Omega_\epsilon), \quad \Omega_\epsilon = \begin{bmatrix} 0.528(0.040) \end{bmatrix}
\]

\[-2\text{loglikelihood} = 2466.822(923 of 1716 cases in use)\]

Avoidance: Model 2c

\[ \text{avoid} \sim N(\mu, \Omega) \]

\[
\text{avoid} = \beta_0 + \text{cons} + 0.546(0.036) \times \text{avoid} + -0.039(0.029) \times \text{time} + -0.045(0.027) \times \text{expvs.c1} + -0.056(0.035) \times \text{expvs.c2} + -0.036(0.019) \times \text{expvs.c1c2} + -0.027(0.057) \times \text{expvs.c1} \times \text{time}.
\]

\[
\beta_0 = 0.119(0.041) + \nu \times \text{cons} + u \times \text{time} + \epsilon \times \text{expvs.c1}.
\]

\[
[\nu] \sim N(0, \Omega_\nu), \quad \Omega_\nu = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
[u] \sim N(0, \Omega_u), \quad \Omega_u = \begin{bmatrix} 0.381(0.050) \end{bmatrix}
\]

\[
[\epsilon] \sim N(0, \Omega_\epsilon), \quad \Omega_\epsilon = \begin{bmatrix} 0.528(0.040) \end{bmatrix}
\]

\[-2\text{loglikelihood} = 2466.822(923 of 1716 cases in use)\]
Avoidance: Model 3
avoid_{gk} \sim N(XB, \Omega)
avoid_{gk} = \beta_0 + \beta_1 x_{1gk} + \beta_2 x_{2gk} + \beta_3 x_{3gk} + \beta_4 x_{4gk} + \beta_5 x_{5gk} + \beta_6 x_{6gk} + \beta_7 x_{7gk} + \beta_8 x_{8gk} + \beta_9 x_{9gk} + \epsilon_{gk}

\beta_0 = 0.120(0.041) + v_{0g} + u_{0g} + e_{0g}

\begin{bmatrix} v_{gk} \\ u_{gk} \\ e_{gk} \end{bmatrix} \sim N(0, \Omega)

\begin{bmatrix} v_{gk} \\ u_{gk} \\ e_{gk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \\ 0.358(0.049) \\ 0.534(0.040) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2455.575(923 of 1716 cases in use)

APRI-A
Pro-Bully: Model 1
problly_{qk} \sim N(XB, \Omega)
problly_{qk} = \beta_0 + \beta_1 x_{1qk} + \beta_2 x_{2qk} + \epsilon_{qk}

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega)

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.025(0.025) \\ 0.492(0.049) \\ 0.469(0.031) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2915.854(1082 of 1716 cases in use)

Pro-Bully: Model 1b
problly_{qk} \sim N(XB, \Omega)
problly_{qk} = \beta_0 + \beta_1 x_{1qk} + \epsilon_{qk}

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega)

\begin{bmatrix} v_{qk} \\ u_{qk} \\ e_{qk} \end{bmatrix} \sim N(0, \Omega) : \Omega = \begin{bmatrix} 0.000(0.000) \\ 0.276(0.035) \\ 0.411(0.051) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2191.824(914 of 1716 cases in use)
**Pro-Bully: Model 2a**

\[
\text{problly}_{gk} \sim N(\chi B, \Omega) \\
\text{problly}_{gk} = \beta_{gk, \text{cons}} + 0.537(0.034) t1\text{problly}_{gk} + 0.003(0.025) \text{time}_{gk} + 0.089(0.029) \expvs.c1c2_{gk} + 0.009(0.034) c1vs.c2_{gk} + 0.007(0.021) \expvs.c1c2.\text{time}_{gk} - 0.034(0.025) c1vs.c2.\text{time}_{gk} \\
\beta_{gk} = -0.005(0.055) + v_{gk} + u_{gk} + e_{gk} \\
\begin{bmatrix} v_{gk} \\ u_{gk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \\
\begin{bmatrix} e_{gk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.269(0.037) \\ 0.269(0.037) \end{bmatrix} \\
\begin{bmatrix} 0.409(0.031) \\ 0.409(0.031) \end{bmatrix} \\
-2\text{loglikelihood(IGLS Deviance)} = 2180.453(914 of 1716 cases in use)
\]

**Pro-Bully: Model 2b**

\[
\text{problly}_{gk} \sim N(\chi B, \Omega) \\
\text{problly}_{gk} = \beta_{gk, \text{cons}} + 0.537(0.034) t1\text{problly}_{gk} + 0.003(0.025) \text{time}_{gk} + 0.049(0.022) \expvs.\exp vs\text{c1}_{gk} + 0.129(0.045) \exp vs.\exp vs\text{c2}_{gk} + 0.014(0.016) \exp vs.\exp vs\text{c1.\text{time}_{gk}} + 0.027(0.034) \exp vs.\exp vs\text{c2.\text{time}_{gk}} \\
\beta_{gk} = -0.005(0.055) + v_{gk} + u_{gk} + e_{gk} \\
\begin{bmatrix} v_{gk} \\ u_{gk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \\
\begin{bmatrix} e_{gk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.269(0.037) \\ 0.269(0.037) \end{bmatrix} \\
\begin{bmatrix} 0.409(0.031) \\ 0.409(0.031) \end{bmatrix} \\
-2\text{loglikelihood(IGLS Deviance)} = 2180.453(914 of 1716 cases in use)
\]

**Pro-Bully: Model 2c**

\[
\text{problly}_{gk} \sim N(\chi B, \Omega) \\
\text{problly}_{gk} = \beta_{gk, \text{cons}} - 0.537(0.034) t1\text{problly}_{gk} + 0.003(0.025) \text{time}_{gk} + 0.040(0.023) \exp vs.\exp vs\text{c1}_{gk} + 0.125(0.046) \exp vs.\exp vs\text{c2}_{gk} + 0.026(0.017) \exp vs.\exp vs\text{c1.\text{time}_{gk}} - 0.007(0.032) \exp vs.\exp vs\text{c2.\text{time}_{gk}} \\
\beta_{gk} = -0.005(0.055) + v_{gk} + u_{gk} + e_{gk} \\
\begin{bmatrix} v_{gk} \\ u_{gk} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000 & 0.000 \\ 0.000 & 0.000 \end{bmatrix} \\
\begin{bmatrix} e_{gk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.269(0.037) \\ 0.269(0.037) \end{bmatrix} \\
\begin{bmatrix} 0.409(0.031) \\ 0.409(0.031) \end{bmatrix} \\
-2\text{loglikelihood(IGLS Deviance)} = 2180.453(914 of 1716 cases in use)
\]

542
**Pro-Bully: Model 2c**

\[
\text{probbly}_{gk} \sim N(XB, \Omega)
\]

\[
\text{probbly}_{gk} = \beta_{0gk}\text{cons} + 0.529(0.042)\text{Xprobbly}_{gk} + -0.093(0.032)\text{expvs.c1c2}_{gk} + -0.005(0.034)\text{c1vs.c2}_{gk} + -0.007(0.023)\text{time}_{gk} + -0.011(0.036)\text{Xprobbly}\expvs.c1c2_{gk} + -0.039(0.036)\text{Xprobbly.c1vs.c2}_{gk} + -0.030(0.028)\text{Xprobbly.time}_{gk} + -0.015(0.024)\text{Xprobbly.expvs.c1c2.time}_{gk} + 0.049(0.027)\text{Xprobbly.c1vs.c2.time}_{gk}
\]

\[
\beta_{b_{gk}} = -0.011(0.057) + \gamma_{g_{bc}} + \bar{u}_{b_{gk}} + e_{b_{gk}}
\]

\[
\begin{bmatrix}
\gamma_{g_{bc}}
\end{bmatrix} \sim N(0, \Omega_1) : \Omega_1 = \begin{bmatrix} 0.000(0.000) \end{bmatrix}
\]

\[
\begin{bmatrix}
\bar{u}_{b_{gk}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.269(0.037) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{b_{gk}}
\end{bmatrix} \sim N(0, \Omega_\varepsilon) : \Omega_\varepsilon = \begin{bmatrix} 0.406(0.031) \end{bmatrix}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 2176.125\text{(914 of 1716 cases in use)}\]

**Pro-Victim: Model 1**

\[
\text{provc}_{gk} \sim N(XB, \Omega)
\]

\[
\text{provc}_{gk} = \beta_{0gk}\text{cons}
\]

\[
\beta_{v_{gk}} = -0.118(0.116) + \gamma_{v_{gk}} + \bar{u}_{v_{gk}} + e_{v_{gk}}
\]

\[
\begin{bmatrix}
\gamma_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_1) : \Omega_1 = \begin{bmatrix} 0.036(0.033) \end{bmatrix}
\]

\[
\begin{bmatrix}
\bar{u}_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.394(0.052) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_\varepsilon) : \Omega_\varepsilon = \begin{bmatrix} 0.656(0.045) \end{bmatrix}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 3048.580\text{(1082 of 1716 cases in use)}\]

**Pro-Victim: Model 1b**

\[
\text{provc}_{gk} \sim N(XB, \Omega)
\]

\[
\text{provc}_{gk} = \beta_{0gk}\text{cons} + 0.463(0.025)\text{Xprovc}_{gk}
\]

\[
\beta_{v_{gk}} = -0.136(0.064) + \gamma_{v_{gk}} + \bar{u}_{v_{gk}} + e_{v_{gk}}
\]

\[
\begin{bmatrix}
\gamma_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_1) : \Omega_1 = \begin{bmatrix} 0.009(0.010) \end{bmatrix}
\]

\[
\begin{bmatrix}
\bar{u}_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.229(0.044) \end{bmatrix}
\]

\[
\begin{bmatrix}
e_{v_{gk}}
\end{bmatrix} \sim N(0, \Omega_\varepsilon) : \Omega_\varepsilon = \begin{bmatrix} 0.550(0.043) \end{bmatrix}
\]

\[-2*\text{loglikelihood(IGLS Deviance)} = 2375.365\text{(914 of 1716 cases in use)}\]
**Pro-Victim: Model 2a**

\[ \text{provice}_{jk} \sim N(\mu, \Omega) \]

\[ \text{provice}_{jk} = \beta_{jk0} \text{cons} + 0.451(0.035) \text{time}_{jk} + 0.015(0.029) \text{time}_{jk} \text{c1c2}_{jk} + 0.036(0.023) \text{vexp}_{c1c2}_{jk} + 0.113(0.051) \text{exp}_{c1c2}_{jk} + 0.010(0.018) \text{exp}_{c1c2}_{jk} \text{time}_{jk} + 0.015(0.038) \text{exp}_{c1c2}_{jk} \text{time}_{jk} \]

\[ \beta_{jk0} = -0.101(0.062) + \nu_{jk0} + u_{jk0} + \epsilon_{jk0} \]

\[ \nu_{jk0} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.007(0.009) \end{bmatrix} \]

\[ \mu_{jk0} \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.223(0.044) \end{bmatrix} \]

\[ \epsilon_{jk0} \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.579(0.043) \end{bmatrix} \]

\[-2\text{loglikelihood(IGLS Deviance)} = 2368.761(914 of 1716 cases in use)\]

**Pro-Victim: Model 2b**

\[ \text{provice}_{jk} \sim N(\mu, \Omega) \]

\[ \text{provice}_{jk} = \beta_{jk0} \text{cons} + 0.451(0.035) \text{time}_{jk} + 0.015(0.029) \text{time}_{jk} \text{c1c2}_{jk} + 0.036(0.023) \text{vexp}_{c1c2}_{jk} + 0.113(0.051) \text{exp}_{c1c2}_{jk} + 0.010(0.018) \text{exp}_{c1c2}_{jk} \text{time}_{jk} + 0.015(0.038) \text{exp}_{c1c2}_{jk} \text{time}_{jk} \]

\[ \beta_{jk0} = -0.101(0.062) + \nu_{jk0} + u_{jk0} + \epsilon_{jk0} \]

\[ \nu_{jk0} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.007(0.009) \end{bmatrix} \]

\[ \mu_{jk0} \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.223(0.044) \end{bmatrix} \]

\[ \epsilon_{jk0} \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.579(0.043) \end{bmatrix} \]

\[-2\text{loglikelihood(IGLS Deviance)} = 2368.761(914 of 1716 cases in use)\]

**Pro-Victim: Model 2c**

\[ \text{provice}_{jk} \sim N(\mu, \Omega) \]

\[ \text{provice}_{jk} = \beta_{jk0} \text{cons} + 0.451(0.035) \text{time}_{jk} + 0.015(0.029) \text{time}_{jk} \text{c1c2}_{jk} + 0.036(0.023) \text{vexp}_{c1c2}_{jk} + 0.113(0.051) \text{exp}_{c1c2}_{jk} + 0.010(0.018) \text{exp}_{c1c2}_{jk} \text{time}_{jk} + 0.015(0.038) \text{exp}_{c1c2}_{jk} \text{time}_{jk} \]

\[ \beta_{jk0} = -0.101(0.062) + \nu_{jk0} + u_{jk0} + \epsilon_{jk0} \]

\[ \nu_{jk0} \sim N(0, \Omega_\nu) : \Omega_\nu = \begin{bmatrix} 0.007(0.009) \end{bmatrix} \]

\[ \mu_{jk0} \sim N(0, \Omega_\mu) : \Omega_\mu = \begin{bmatrix} 0.223(0.044) \end{bmatrix} \]

\[ \epsilon_{jk0} \sim N(0, \Omega_\epsilon) : \Omega_\epsilon = \begin{bmatrix} 0.579(0.043) \end{bmatrix} \]

\[-2\text{loglikelihood(IGLS Deviance)} = 2368.761(914 of 1716 cases in use)\]
Pro-Victim: Model 3

provict,pk ~ N(Xpk, \Omega)

provict,pk = \beta_{vcie}consv + 0.452(0.045)t1provict,pk + 0.072(0.034)expvs.c1c2,pk + -0.004(0.036)c1vs.c2,pk + -0.020(0.027)time,pk + 0.013(0.039)t1provict.expvs.c1c2,pk + -0.099(0.037)t1provict.c1vs.c2,pk + -0.013(0.033)t1provict.time,pk + 0.005(0.028)t1provict.expvs.c1c2.time,pk + -0.006(0.030)t1provict.c1vs.c2.time,pk

\beta_{vcie} = -0.112(0.059) + v_{vcie} + u_{vcie} + \epsilon_{vcie}

\begin{align*}
\begin{bmatrix} v_{vcie} \\ u_{vcie} \\ \epsilon_{vcie} \end{bmatrix} & \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.005(0.007) \\ 0.214(0.043) \\ 0.581(0.043) \end{bmatrix}
\end{align*}

-2*loglikelihood(DBGLS Deviance) = 2361.590(914 of 1716 cases in use)

Support Scales

Parent Support: Model 1

parsup,pk ~ N(Xpk, \Omega)

parsup,pk = \beta_{par}cons

\beta_{par} = -0.170(0.057) + v_{par} + u_{par} + \epsilon_{par}

\begin{align*}
\begin{bmatrix} v_{par} \\ u_{par} \\ \epsilon_{par} \end{bmatrix} & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.000(0.000) \\ 0.612(0.059) \\ 0.379(0.040) \end{bmatrix}
\end{align*}

-2*loglikelihood(DBGLS Deviance) = 3256.109(1122 of 1716 cases in use)

Parent Support: Model 1b

parsupp,k ~ N(Xpk, \Omega)

parsupp,k = \beta_{cpp}cons + 0.681(0.031)t1parsupp,k

\beta_{cpp} = -0.162(0.054) + v_{cpp} + u_{cpp} + \epsilon_{cpp}

\begin{align*}
\begin{bmatrix} v_{cpp} \\ u_{cpp} \\ \epsilon_{cpp} \end{bmatrix} & \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.606(0.007) \\ 0.201(0.039) \\ 0.531(0.039) \end{bmatrix}
\end{align*}

-2*loglikelihood(DBGLS Deviance) = 2403.684(961 of 1716 cases in use)
Parent Support: Model 2a
\[ \text{parsup}_{pk} \sim N(\mu_{pk}, \Omega) \]
\[ \text{parsup}_{pk} = \beta_0_{pk} \text{cons} + 0.678(0.032)1_{\text{parsup}_{pk}} + 0.012(0.028)\text{time}_{pk} + 0.027(0.029)\text{expv}_{c1c2pk} + \\
-0.013(0.033)\text{c1vs.c2}_{pk} + -0.008(0.023)\text{expv}_{c1c2pk} + 0.052(0.027)\text{c1vs.c2_time}_{pk} \]
\[ \beta_{pk} = -0.147(0.056) + \nu_{pk} + u_{pk} + e_{pk} \]
\[ [\nu_{pk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.006(0.007) \end{bmatrix} \]
\[ [u_{pk}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.206(0.039) \end{bmatrix} \]
\[ [e_{pk}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.524(0.058) \end{bmatrix} \]

-2*loglikelihood(LGLS Deviance) = 2398.549 (961 of 1716 cases in use)

Parent Support: Model 2b
\[ \text{parsup}_{pk} \sim N(\mu_{pk}, \Omega) \]
\[ \text{parsup}_{pk} = \beta_0_{pk} \text{cons} + 0.678(0.032)1_{\text{parsup}_{pk}} + 0.012(0.028)\text{time}_{pk} + 0.027(0.029)\text{expv}_{c2pk} + \\
0.046(0.048)\text{expv}_{c1c2pk} + 0.022(0.017)\text{expv}_{c1c2pk} + 0.035(0.038)\text{expv}_{c1c2_time}_{pk} \]
\[ \beta_{pk} = -0.147(0.056) + \nu_{pk} + u_{pk} + e_{pk} \]
\[ [\nu_{pk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.006(0.007) \end{bmatrix} \]
\[ [u_{pk}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.206(0.039) \end{bmatrix} \]
\[ [e_{pk}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.524(0.058) \end{bmatrix} \]

-2*loglikelihood(LGLS Deviance) = 2398.549 (961 of 1716 cases in use)

Parent Support: Model 2c
\[ \text{parsup}_{pk} \sim N(\mu_{pk}, \Omega) \]
\[ \text{parsup}_{pk} = \beta_0_{pk} \text{cons} + 0.678(0.032)1_{\text{parsup}_{pk}} + 0.012(0.028)\text{time}_{pk} + 0.027(0.029)\text{expv}_{c2pk} + \\
0.034(0.046)\text{expv}_{c1c2pk} + 0.030(0.018)\text{expv}_{c2pk} + 0.015(0.036)\text{expv}_{c1_time}_{pk} \]
\[ \beta_{pk} = -0.147(0.056) + \nu_{pk} + u_{pk} + e_{pk} \]
\[ [\nu_{pk}] \sim N(0, \Omega_{\nu}) : \Omega_{\nu} = \begin{bmatrix} 0.006(0.007) \end{bmatrix} \]
\[ [u_{pk}] \sim N(0, \Omega_{u}) : \Omega_{u} = \begin{bmatrix} 0.206(0.039) \end{bmatrix} \]
\[ [e_{pk}] \sim N(0, \Omega_{e}) : \Omega_{e} = \begin{bmatrix} 0.524(0.058) \end{bmatrix} \]

-2*loglikelihood(LGLS Deviance) = 2398.549 (961 of 1716 cases in use)
Parent Support: Model 3
\[ \text{parsup}_{\text{ge}} \sim N(XB, \Omega) \]
\[ \text{parsup}_{\text{ge}} = \beta_{0}\text{cons} + 0.745(0.045)\text{time}_{\text{ge}} + 0.003(0.031)\text{expvs}\text{c1c2}_{\text{ge}} + 0.023(0.033)\text{c1vs}\text{c2}_{\text{ge}} + 
\]
\[ -0.011(0.025)\text{time}_{\text{ge}} + 0.096(0.041)\text{time}_{\text{ge}} + 0.025(0.033)\text{time}_{\text{ge}} + 
\]
\[ -0.043(0.035)\text{time}_{\text{ge}} + 0.020(0.032)\text{time}_{\text{ge}} + 
\]
\[ \beta_{\text{ge}} = -0.173(0.056) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]
\[ \begin{bmatrix} \nu_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.005(0.007) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.193(0.039) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.531(0.039) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2394.988\text{ of 1716 cases in use}\]

Peer Support: Model 1
\[ \text{persup}_{\text{ge}} \sim N(XB, \Omega) \]
\[ \text{persup}_{\text{ge}} = \beta_{0}\text{cons} + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]
\[ \beta_{\text{ge}} = -0.034(0.045) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]
\[ \begin{bmatrix} \nu_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.002(0.005) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.536(0.050) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.458(0.032) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2990.672\text{ of 1103 cases in use}\]

Peer Support: Model 1b
\[ \text{persup}_{\text{ge}} \sim N(XB, \Omega) \]
\[ \text{persup}_{\text{ge}} = \beta_{0}\text{cons} + 0.489(0.031)\text{time}_{\text{ge}} \]
\[ \beta_{\text{ge}} = 0.006(0.031) + \nu_{\text{ge}} + u_{\text{ge}} + e_{\text{ge}} \]
\[ \begin{bmatrix} \nu_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \]
\[ \begin{bmatrix} u_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 0.504(0.039) \end{bmatrix} \]
\[ \begin{bmatrix} e_{\text{ge}} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.419(0.031) \end{bmatrix} \]
\[-2*\text{loglikelihood(IGLS Deviance)} = 2308.655\text{ of 945 cases in use}\]
Peer Support: Model 2a
persup_{pk} \sim N(X_{pk}, \Omega)
persup_{pk} = \beta_{pdk}cons + 0.488(0.031) \times \text{persup}_{pk} + -0.026(0.025) \times \text{time}_{pk} + 0.028(0.030) \times \text{exps}.c1c2_{pk} + 
-0.007(0.034) \times \text{exps}.c2_{pk} + -0.019(0.021) \times \text{exps}.c1c2.time_{pk} + -0.027(0.025) \times \text{exps}.c2.time_{pk}

\beta_{pdk} = 0.020(0.036) + \nu_{pk} + u_{pdk} + \epsilon_{pdk}

\begin{bmatrix} \nu_{pk} \\ \eta_{pdk} \\ \epsilon_{pdk} \end{bmatrix} \sim N(0, \Omega_{\nu}) \quad \Omega_{\nu} = \begin{bmatrix} 0.006(0.000) \\ 0.031(0.039) \\ 0.418(0.031) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2305.155 (945 of 1716 cases in use)

Peer Support: Model 2b
persup_{pk} \sim N(X_{pk}, \Omega)
persup_{pk} = \beta_{pdk}cons + 0.488(0.031) \times \text{persup}_{pk} + -0.026(0.025) \times \text{time}_{pk} + 0.010(0.022) \times \text{exps}.c2c3_{pk} + 
0.046(0.049) \times \text{exps}.c2_{pk} + -0.025(0.016) \times \text{exps}.c1c2.time_{pk} + -0.015(0.034) \times \text{exps}.c2.time_{pk}

\beta_{pdk} = 0.020(0.036) + \nu_{pk} + u_{pdk} + \epsilon_{pdk}

\begin{bmatrix} \nu_{pk} \\ \eta_{pdk} \\ \epsilon_{pdk} \end{bmatrix} \sim N(0, \Omega_{\nu}) \quad \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \\ 0.301(0.039) \\ 0.418(0.031) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2305.155 (945 of 1716 cases in use)

Peer Support: Model 2c
persup_{pk} \sim N(X_{pk}, \Omega)
persup_{pk} = \beta_{pdk}cons + 0.488(0.031) \times \text{persup}_{pk} + -0.026(0.025) \times \text{time}_{pk} + -0.018(0.024) \times \text{exps}.c2c3_{pk} + 
0.038(0.047) \times \text{exps}.c1c2_{pk} + -0.004(0.017) \times \text{exps}.c2c3.time_{pk} + -0.042(0.033) \times \text{exps}.c1c2.time_{pk}

\beta_{pdk} = 0.020(0.036) + \nu_{pk} + u_{pdk} + \epsilon_{pdk}

\begin{bmatrix} \nu_{pk} \\ \eta_{pdk} \\ \epsilon_{pdk} \end{bmatrix} \sim N(0, \Omega_{\nu}) \quad \Omega_{\nu} = \begin{bmatrix} 0.000(0.000) \\ 0.301(0.039) \\ 0.418(0.031) \end{bmatrix}

-2*loglikelihood(IGLS Deviance) = 2305.155 (945 of 1716 cases in use)
Peer Support: Model 3

\[ \text{persup}_{gk} \sim N(\mathbf{X}_g, \Omega) \]

\[ \text{persup}_{gk} = \beta_{p_gk} \text{cons} + 0.461(0.039) \text{t1persup}_{gk} + 0.033(0.030) \text{expvs.c1c2}_{gk} + -0.009(0.034) \text{c1vs.c2}_{gk} + -0.011(0.023) \text{time}_{gk} + -0.010(0.034) \text{t1persup.expv.s.c1c2}_{gk} + -0.105(0.034) \text{t1persup.c1v.s.c2}_{gk} + -0.016(0.028) \text{t1persup.time}_{gk} + -0.002(0.024) \text{t1persup.expvs.c1c2.time}_{gk} + 0.060(0.025) \text{t1persup.c1v.s.c2.time}_{gk} \]

\[ \beta_{p_gk} = 0.022(0.036) + v_{p_k} + u_{p_k} + e_{p_k} \]

\[
\begin{bmatrix} v_{p_k} \\ u_{p_k} \\ e_{p_k} \end{bmatrix} \sim N(0, \Omega_p) : \Omega_p = \begin{bmatrix} 0.000(0.001) \\ 0.289(0.038) \\ 0.417(0.031) \end{bmatrix}
\]

\[-2\times \text{loglikelihood(GLS Deviance)} = 2239.095(945 of 1716 cases in use)\]

Enjoyment of School Scale

Enjoyment of School: Model 1

\[ \text{enjsch}_{gk} \sim N(\mathbf{X}_g, \Omega) \]

\[ \text{enjsch}_{gk} = \beta_{es_gk} \text{cons} \]

\[ \beta_{es_gk} = -0.090(0.036) + v_{e_k} + u_{e_k} + e_{e_k} \]

\[
\begin{bmatrix} v_{e_k} \\ u_{e_k} \\ e_{e_k} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.000(0.000) \\ 0.673(0.055) \\ 0.452(0.031) \end{bmatrix}
\]

\[-2\times \text{loglikelihood(GLS Deviance)} = 3258.613(1166 of 1716 cases in use)\]

Enjoyment of School: Model 1b

\[ \text{enjsch}_{gk} \sim N(\mathbf{X}_g, \Omega) \]

\[ \text{enjsch}_{gk} = \beta_{es_gk} \text{cons} + 0.638(0.032) \text{t1enjsch}_{gk} \]

\[ \beta_{es_gk} = -0.108(0.031) + v_{e_k} + u_{e_k} + e_{e_k} \]

\[
\begin{bmatrix} v_{e_k} \\ u_{e_k} \\ e_{e_k} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 0.000(0.000) \\ 0.321(0.038) \\ 0.405(0.029) \end{bmatrix}
\]

\[-2\times \text{loglikelihood(GLS Deviance)} = 2442.384(1002 of 1716 cases in use)\]

549
**Enjoyment of School: Model 2a**

$$\text{enjsch}_{gk} \sim N(\beta_{g0k}\text{cons} + 0.626(0.033)\text{tenenjsch}_{gk} + 0.031(0.024)\text{time}_{gk} + 0.068(0.030)\text{expsvs.clc2}_{gk} + -0.024(0.034)\text{clsvs.clc2}_{gk} + -0.005(0.020)\text{expsvs.clc2.time}_{gk} + 0.053(0.023)\text{clvs.clc2.time}_{gk})$$

$$\beta_{g0k} = -0.066(0.036) + v_{g0k} + u_{gk} + \epsilon_{gpk}$$

$$\begin{bmatrix} v_{g0k} \\ u_{g0k} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.324(0.037) \end{bmatrix}$$

$$\begin{bmatrix} \epsilon_{gpk} \end{bmatrix} \sim N(0, \Omega_r) : \Omega_r = \begin{bmatrix} 0.395(0.029) \end{bmatrix}$$

$$-2\text{loglikelihood(GLS Deviance)} = 2428.651(1002 \text{ of } 1716 \text{ cases in use})$$

**Enjoyment of School: Model 2b**

$$\text{enjsch}_{gk} \sim N(\beta_{g0k}\text{cons} + 0.626(0.033)\text{tenenjsch}_{gk} + 0.031(0.024)\text{time}_{gk} + 0.022(0.025)\text{expsvs.clc1}_{gk} + -0.114(0.049)\text{expsvs.clc2}_{gk} + 0.026(0.015)\text{expsvs.clc2.time}_{gk} + -0.037(0.033)\text{expsvs.clc2.time}_{gk})$$

$$\beta_{g0k} = -0.066(0.036) + v_{g0k} + u_{gk} + \epsilon_{gpk}$$

$$\begin{bmatrix} v_{g0k} \\ u_{g0k} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.324(0.037) \end{bmatrix}$$

$$\begin{bmatrix} \epsilon_{gpk} \end{bmatrix} \sim N(0, \Omega_r) : \Omega_r = \begin{bmatrix} 0.395(0.029) \end{bmatrix}$$

$$-2\text{loglikelihood(GLS Deviance)} = 2428.652(1002 \text{ of } 1716 \text{ cases in use})$$

**Enjoyment of School: Model 2c**

$$\text{enjsch}_{gk} \sim N(\beta_{g0k}\text{cons} + 0.626(0.033)\text{tenenjsch}_{gk} + 0.031(0.024)\text{time}_{gk} - 0.046(0.023)\text{clcvslc2}_{gk} + 0.009(0.045)\text{expsvs.clc2}_{gk} + 0.032(0.016)\text{expsvs.clc2.time}_{gk} - 0.021(0.031)\text{expsvs.clc2.time}_{gk})$$

$$\beta_{g0k} = -0.066(0.036) + v_{g0k} + u_{gk} + \epsilon_{gpk}$$

$$\begin{bmatrix} v_{g0k} \\ u_{g0k} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 0.000(0.000) \\ 0.324(0.037) \end{bmatrix}$$

$$\begin{bmatrix} \epsilon_{gpk} \end{bmatrix} \sim N(0, \Omega_r) : \Omega_r = \begin{bmatrix} 0.395(0.029) \end{bmatrix}$$

$$-2\text{loglikelihood(GLS Deviance)} = 2428.652(1002 \text{ of } 1716 \text{ cases in use})$$
Enjoyment of School: Model 3
enjsch_{pk} \sim N(\mu_{pk}, \Omega_{v})

enjsch_{pk} = \beta_{0p} \times \text{cons} + 0.600(0.040) \times \text{enjsch}_{pk} + 0.085(0.032) \times \text{expvs.c1c2}_{pk} + 0.035(0.033) \times \text{clvs.c2}_{pk} + 0.024(0.022) \times \text{time}_{pk} + -0.040(0.034) \times \text{enjsch}\times\text{expvs.c1c2}_{pk} + -0.058(0.035) \times \text{enjsch}\times\text{clvs.c2}_{pk} + 0.022(0.026) \times \text{enjsch}\times\text{time}_{pk} + -0.010(0.021) \times \text{enjsch}\times\text{expvs.c1c2}\times\text{time}_{pk} + 0.018(0.025) \times \text{enjsch}\times\text{clvs.c2}\times\text{time}_{pk}

\beta_{0p} = -0.053(0.038) + v_{0p} + u_{0p} + \epsilon_{0p}

\begin{bmatrix} v_{0p} \\ u_{0p} \\ \epsilon_{0p} \end{bmatrix} \sim N(0, \Omega_{v}) : \begin{bmatrix} \Omega_{v} = \begin{bmatrix} 0.000(0.000) \end{bmatrix} \\ \Omega_{u} = \begin{bmatrix} 0.314(0.037) \end{bmatrix} \\ \Omega_{\epsilon} = \begin{bmatrix} 0.401(0.029) \end{bmatrix} \end{bmatrix}

-2^{\times\text{loglikelihood(IGLS Deviance)}} = 2428.400(1002 of 1716 cases in use)
REFERENCES


developmental transitions during adolescence. Cambridge: Cambridge University Press.


Sim, Hee-Og. (2000). Relationship of daily hassles and social support to depression and antisocial behavior among early adolescents. *Journal of Youth and Adolescence, 29*(6), 647-659.


Peers Helping Peers:
The Effectiveness of a Peer Support Program in Enhancing
Self-Concept and Other Desirable Outcomes

Volume 1

by

Louise A. Ellis
B. Psych (Hons.), Macquarie University

A thesis submitted to the School of Psychology, University of Western Sydney, in fulfilment of the requirements for the degree of Doctor of Philosophy

December, 2004

© L. A. Ellis, 2004
PLEASE NOTE

The greatest amount of care has been taken while scanning this thesis,

and the best possible result has been obtained.
Dedicated to my parents, who have always believed in me and who taught me to never give up on my dreams.
ACKNOWLEDGEMENTS

I would like to thank my supervisors, Professor Herbert Marsh and Associate Professor Rhonda Craven, for their continued encouragement, guidance and support throughout the course of my candidature. I am particularly grateful for their assistance with the research design, statistical advice and comprehensive feedback on my thesis chapters. It has certainly been both a privilege and a pleasure to have been supervised by you both.

I am also grateful to the Peer Support Foundation, Catholic Education Commission, Australian Research Council, as well as the principals and staff from the participating schools, for their cooperation and kind permission to carry out the research. Thanks must also go to the participating students for their time and continued effort throughout the study. Additionally, I am grateful to Garry Richards, Dr. Andrew Martin, Roberto Parada, Danielle Tracey, Katrina Simpson, Trinh Ha and Linda Finger for their assistance at various stages of the research.

Special thanks must go to my husband, Joey, for his overwhelming patience and understanding. Without your love and support, I’m sure I would have never made it through my candidature. Special thanks must also go to my parents, for their unwavering support and confidence in me. I am also grateful to my brother, Graham, for his endless patience in sorting out my computer problems. Finally, I would like to thank all of my friends for providing me with an outlet through our regular chats and coffee breaks. I feel very lucky to have had such strong support from so many people as I have travelled along this difficult and often frustrating path.
Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text. I hereby declare that I have not submitted this material, either in whole or in part, for a degree at this or any other institution.

........................................
(Signature)
CONTENTS

1. INTRODUCTION.............................................................................................................. 1

2. LITERATURE REVIEW.................................................................................................... 6
   Introduction...................................................................................................................... 6
   The Impact of Transition to Adolescence and Secondary School: An Overview of Research Evidence .................................................................................................................. 6
   Impact of Transition Upon Self-Esteem and Self-Concept............................................ 7
   Impact of Transition Upon Attitude to School and Academic Achievement .... 10
   Impact of Transition Upon Psychological Functioning ............................................. 12
   Summary: The Impact of Transition to Secondary School Upon Adolescents . 14
   Unravelling the Factors that Affect Adjustment ......................................................... 14
   Coping Resources ........................................................................................................ 15
   Social Support ............................................................................................................... 16
   Expectancies for Success .............................................................................................. 17
   School Connectedness .................................................................................................. 19
   Summary: Factors that Affect Adjustment .................................................................. 20
   The Nature of Student’s Social Environment .............................................................. 20
   School Settings Affecting Transition ........................................................................... 22
   Home Settings Affecting Transition ............................................................................ 23
   Summary: School and Home Settings Affecting Transition ...................................... 24
   Programs Designed to Ease the Transition ................................................................. 25
   Orientation Programs .................................................................................................. 25
   Extended Programs ...................................................................................................... 26
   Skills Training ................................................................................................................ 27
   Peer Support Programs ............................................................................................... 28
   Summary: Programs Designed to Ease the Transition .............................................. 31
The Potential Power of Peer Support Programs.......................... 31
Benefits for Peer Leaders ...................................................... 32
Implications for the Present Investigation ............................. 33
Summary ............................................................................. 35

3. PROGRAM BACKGROUND AND DESCRIPTION....................... 36

Introduction ...................................................................... 36
Origins of the Peer Support Foundation ............................. 36
Characteristics of the Secondary School Peer Support Program ........ 37
Overview of the Secondary School Peer Support Program ......... 37

Goals and Objectives of the Program .................................... 38

School competence ............................................................ 38
School citizenship .............................................................. 38
Sense of self ..................................................................... 38
Connectedness .................................................................. 39
Resourcefulness ............................................................... 39
Sense of possibility ............................................................ 39

Detailed Description of the Program ..................................... 39

Orientation Module .............................................................. 40

Session one ..................................................................... 40
Session two .................................................................... 41
Session three ................................................................. 42
Session four ................................................................. 43

Positive Action Module ........................................................ 44

Session one ..................................................................... 44
Session two .................................................................... 45
Session three ................................................................. 46
Session four ................................................................. 48
Session five .................................................................... 49
Session six .................................................................... 49
Session seven ............................................................... 51
Session eight ............................................................... 51

Features for Successful Implementation .............................. 52

Teacher Roles and Training ................................................... 53

The role and training of the coordinating teacher .................. 53
The role and training of facilitating teachers .......................... 53
4. HYPOTHESES, RESEARCH QUESTIONS AND THEIR RATIONALE .. 57

Introduction .................................................................................................................. 57

Study 1: Psychometric Properties of the Measurement Instruments ......................... 58

Aims ............................................................................................................................... 58

The Problem .................................................................................................................. 58

Statement of the Hypotheses ......................................................................................... 58

Rationale for the Hypotheses ......................................................................................... 58

Study 2: Effects of the Intervention on Year 7 Students ................................................ 59

Aims ............................................................................................................................... 59

The Problem .................................................................................................................. 59

Statement of the Hypotheses ......................................................................................... 59

Predicted effects on school self-concept. ................................................................. 60
Predicted effects on school citizenship. ................................................................. 60
Predicted effects on general sense of self. ............................................................. 60
Predicted effects on connectedness .......................................................................... 61
Predicted effects on resourcefulness ....................................................................... 61
Predicted effects on sense of possibility .................................................................... 62

Statement of the Research Questions ...................................................................... 62

Rationale for the Hypotheses and Research Questions ............................................. 63

Rationale for school self-concept predictions ......................................................... 63
Rationale for school citizenship ............................................................................... 64
Rationale for sense of self ......................................................................................... 65
Rationale for connectedness ...................................................................................... 65
Rationale for resourcefulness .................................................................................... 66
Rationale for sense of possibility .............................................................................. 67

Rationale for Research Questions ............................................................................ 67

Study 3: Effects of the Intervention on the Peer Support Leaders ............................. 68

Aims ............................................................................................................................... 68

The Problem .................................................................................................................. 68
6. STUDY 1 RESULTS: PSYCHOMETRIC PROPERTIES OF THE MEASUREMENT INSTRUMENTS

Introduction .................................................................................................................. 103
Overview of Analyses ................................................................................................. 104
Psychometric Properties of the SDQII – S ................................................................. 105
   Internal Consistency Estimates .............................................................................. 105
   Factor Structure ..................................................................................................... 106
   Factor Invariance Across Age .............................................................................. 108
Psychometric Properties of the ROPE ....................................................................... 110
   Internal Consistency ............................................................................................. 110
   Factor Structure ..................................................................................................... 110
   Factor Invariance Across Age .............................................................................. 112
Psychometric Properties of the CSI-S ....................................................................... 114
   Internal Consistency ............................................................................................. 114
   Factor Structure ..................................................................................................... 115
   Factor Invariance Across Age .............................................................................. 116
Psychometric Properties of the APRI-A ................................................................... 117
   Internal Consistency ............................................................................................. 117
   Factor Structure ..................................................................................................... 117
   Factor Invariance Across Age .............................................................................. 118
Psychometric Properties of the Support Scales ....................................................... 120
   Internal Consistency ............................................................................................. 120
   Factor Analysis ...................................................................................................... 120
   Factor Invariance Across Age .............................................................................. 121
Psychometric Properties of the Enjoyment of School Scale ................................... 123
   Internal Consistency ............................................................................................. 123
   Factor Analysis ...................................................................................................... 123
Factor Invariance Across Age .......................................................... 123

Summary of Reliability and CFA Results ........................................... 125

Multifactorial Analysis Including all Instruments ................................ 126

Factor Structure ............................................................................. 126

Factor Correlations ........................................................................ 126

Factor Invariance Across Age .......................................................... 127

Summary ......................................................................................... 129

7. STUDY 2 RESULTS: EFFECTS OF THE INTERVENTION ON YEAR 7 STUDENTS ................................................................. 130

Introduction .................................................................................... 130

Overview of Statistical Analyses ...................................................... 131

Preliminary Analyses ....................................................................... 132

School Self-Concept ....................................................................... 134

Hypothesis 2.1: Effects on General School Self-Concept .................. 134

Hypothesis 2.2: Effects on Verbal Self-Concept ............................. 140

Summary of Results for School Self-Concept .................................. 142

School Citizenship .......................................................................... 143

Hypotheses 2.3 and 2.4: Effects on Perceptions of Bullying ............ 143

Hypothesis 2.5: Effects on Honesty/Trustworthiness ..................... 148

Summary of Results for School Citizenship .................................... 150

General Sense of Self ..................................................................... 152

Hypothesis 2.6: Effects on Self-Confidence .................................... 152

Hypothesis 2.7: Effects on Global Self-Esteem ............................... 154

Summary of Results for General Sense of Self ............................... 155

Connectedness .............................................................................. 157

Hypotheses 2.8 and 2.9: Effects on Peer Relations ......................... 157

Hypothesis 2.10: Effects on Cooperative Teamwork ...................... 160
8. STUDY 3 RESULTS: EFFECTS OF THE INTERVENTION ON PEER SUPPORT LEADERS ........................................................................................................ 197

Introduction ....................................................................................................... 197
Overview of Statistical Analyses ......................................................................... 197
Preliminary Analyses ........................................................................................ 198
Effects of the Intervention on Leadership Ability ................................................. 201
Hypothesis 3.1: Leadership Ability ..................................................................... 201
Summary of Results for Leadership Ability ....................................................... 209
School Self-Concept .......................................................................................... 210
Effects on Global School Self-Concept .............................................................. 210
Effects on Verbal Self-Concept .......................................................................... 212
Summary of Results for School Self-Concept ................................................... 214
Historical Background to the Emergence of Mixed Methods Research and Rationale for this Approach in the Current Study........................................... 262

Overview of Research Methods for Study 4........................................... 264
  Quantitative Methods........................................................................... 264
  Qualitative Methods ........................................................................... 264

Quantitative Results ............................................................................. 266
  Year 7 Evaluations of the Program ...................................................... 266
  Year 7 Evaluations of their Peer Support Group .................................. 268
  Year 7 Evaluations of their Leaders .................................................... 268
  Leader Evaluation of Program Organisation ....................................... 269
  Leader Evaluation of Program ........................................................... 270
  Leader Evaluation of Value to Self ..................................................... 271

Summary of Quantitative Results .......................................................... 273

Qualitative Results: Perceived Benefits for Year 7 Students................. 274

Preliminary Open-Ended Questionnaire Results .................................. 274

Preliminary Examination of Content Analysis Results ........................ 275

Higher Order Theme 1: Student Connectedness .................................. 276
  Open-ended questionnaire items ....................................................... 276
  Focus group discussions .................................................................. 279
  Summary ......................................................................................... 281

Higher Order Theme 2: Problem-Solving Ability ................................ 281
  Open-ended questionnaire items ....................................................... 281
  Focus group discussions .................................................................. 282
  Summary ......................................................................................... 283

Higher Order Theme 3: Sense of Self .................................................... 283
  Open-ended questionnaire items ....................................................... 283
  Focus group discussions .................................................................. 284
  Summary ......................................................................................... 285

Higher Order Theme 4: Sense of Possibility ........................................ 285
  Open-ended questionnaire items ....................................................... 285
  Focus group discussions .................................................................. 286
Social Support ................................................................. 318
Self-Efficacy ................................................................. 318

Summary of Discussion of Psychometric Properties of Instruments ........ 319

Impact of the Peer Support Program on Year 7 Students ...................... 319
  School self-concept ...................................................... 321
  School citizenship ....................................................... 321
  Sense of self .............................................................. 322
  Connectedness ........................................................... 324
  Resourcefulness ......................................................... 326
  Sense of possibility ..................................................... 327
  Effects on other psychological outcomes ................................ 327

Summary of Discussion of Impact of the Peer Support Program on Year 7 students ................................................................. 328

Impact of the Peer Support Program on Year 10/11 Students .................. 328
  Leadership ability ......................................................... 329
  School self-concept ...................................................... 329
  School citizenship ....................................................... 330
  Sense of self .............................................................. 331
  Connectedness ........................................................... 331
  Resourcefulness and sense of possibility ............................... 332
  Effects on other psychological outcomes ............................... 332

Summary of Discussion of Impact of the Peer Support Program on Year 10/11 Students ................................................................. 332

Evaluation of the Strengths and Weaknesses of the Peer Support Program .... 333

Strengths of the Current Investigation ....................................... 335
Limitations of the Current Thesis ............................................. 337
Implications and Directions for Further Research .............................. 338
Implications for Practice .................................................. 340
Summary ................................................................. 340

11. SUMMARY AND CONCLUSIONS ........................................ 342

REFERENCES .................................................................... 346
APPENDICES .................................................................... 376
LIST OF TABLES

5.1 Characteristics of Study 2 Participants in the Experimental Group (n = 452) and Control Group (n = 478) .......................................................... 73

5.2 Characteristics of Study 3 Participants in the Experimental Group (n = 99), Control Group 1 (n = 412) and Control Group 2 (n = 347) ................. 74

5.3 Summary Description of the SDQII-S Scales ........................................ 76

5.4 Summary Description of the ROPE scales ............................................. 78

5.5 Summary Description of the CSI scales .................................................. 79

5.6 Summary Description of the APRI-A scales ......................................... 80

5.7 Summary Description of the Support Scales Used in the Present Study ....... 81

5.8 Orthogonal Contrast Sets Employed in Study 3 .................................... 101

6.1 Internal Consistency Coefficients for the SDQII-S at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each of the Self-Concept Scales .................................. 106

6.2 Factor Structure for and Correlations among the SDQII-S Scales ............ 107

6.3 Invariance Tests Across Age for the SDQII-S ........................................ 108

6.4 Internal Consistency Coefficients for the ROPE at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Life Effectiveness Scale ...................................... 111

6.5 Factor Structure for and Correlations among the ROPE Scales ............... 112

6.6 Invariance Tests Across Age for the ROPE ............................................ 113

6.7 Internal Consistency Coefficients for the CSI-S at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Coping Scale ............................................. 114

6.8 Factor Structure for and Correlations among the CSI-S Scales ............... 115

6.9 Invariance Tests Across Age for the CSI-S ............................................ 116

6.10 Internal Consistency Coefficients for the APRI-A at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Bullying Attitude Scale .................................... 117

6.11 Factor Structure for and Correlations among the APRI-A Scales ............ 118

6.12 Invariance Tests Across Age for the APRI-A ....................................... 119
6.13 Internal Consistency Coefficients for the Support Scales at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Support Scale .............................................. 120

6.14 Factor Structure for and Correlations among the Support Scales ................. 121

6.15 Invariance Tests Across Age for the Support Scales ................................. 122

6.16 Invariance Tests Across Age for the Enjoyment of School Scale ............... 124

6.17 Correlations among the 31 factors (n = 2,229) ........................................... 128

7.1 Model Testing for Differences in T1 Scores ......................................................... 133

7.2 Multilevel Models for Year 7 Students on the Verbal Self-Concept Scale .... 141

7.3 Multilevel Models for Year 7 Students on the Pro-bully Scale ....................... 144

7.4 Multilevel Models for Year 7 Students on the Pro-Victim Scale .................... 146

7.5 Multilevel Models for Year 7 Students on the Honesty/Trustworthiness Scale ......................................................................................................................... 149

7.6 Multilevel Models for Year 7 Students on the Self-Confidence Scale ............ 152

7.7 Multilevel Models for Year 7 Students on the Global Self-Esteem Scale ....... 155

7.8 Multilevel Models for Year 7 Students on the Same-Sex Relations Self-Concept Scale .................................................................................................. 157

7.9 Multilevel Models for Year 7 Students on the Opposite-Sex Relations Self-Concept Scale ......................................................................................... 158

7.10 Multilevel Models for Year 7 Students on the Cooperative Teamwork Scale .................................................................................................................. 161

7.11 Multilevel Models for Year 7 Students on the Peer Support Scale .............. 164

7.12 Multilevel Models for Year 7 Students on the Problem Solving Scale .......... 168

7.13 Multilevel Models for Year 7 Students on the Support Seeking Scale .......... 169

7.14 Multilevel Models for Year 7 Students on the Problem Avoidance Scale .... 170

7.15 Multilevel Models for Year 7 Students on the Open Thinking Scale .......... 172

7.16 Multilevel Models for Year 7 Students on the Coping with Change Scale .... 174

7.17 Multilevel Models for Year 7 Students on the Time Efficiency Scale .......... 175

7.18 Multilevel Models for Year 7 Students on the Stress Management Scale .... 177

7.19 Multilevel Models for Year 7 Students on the Self-Efficacy Scale ............... 180
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.20</td>
<td>Multilevel Models for Year 7 Students on the Remaining Outcomes</td>
<td>189</td>
</tr>
<tr>
<td>7.21</td>
<td>Variance Components Models with Peer Support Group as a Level</td>
<td>193</td>
</tr>
<tr>
<td>8.1</td>
<td>Contrasts Used in Preliminary Analyses</td>
<td>199</td>
</tr>
<tr>
<td>8.2</td>
<td>Results for Contrasts used to Test for Differences between the Groups at T1</td>
<td>200</td>
</tr>
<tr>
<td>8.3</td>
<td>Multilevel Models for Year 10/11 Students on the Global School Self-Concept Scale</td>
<td>211</td>
</tr>
<tr>
<td>8.4</td>
<td>Multilevel Models for Year 10/11 Students on the Verbal Self-Concept Scale</td>
<td>213</td>
</tr>
<tr>
<td>8.5</td>
<td>Multilevel Models for Year 10/11 Students on the Pro-Bully Scale</td>
<td>216</td>
</tr>
<tr>
<td>8.6</td>
<td>Multilevel Models for Year 10/11 Students on the Pro-Victim Scale</td>
<td>218</td>
</tr>
<tr>
<td>8.7</td>
<td>Multilevel Models for Year 10/11 Students on the Honesty/Trustworthiness Scale</td>
<td>220</td>
</tr>
<tr>
<td>8.8</td>
<td>Multilevel Models for Year 10/11 Students on the Self-Confidence Scale</td>
<td>223</td>
</tr>
<tr>
<td>8.9</td>
<td>Multilevel Models for Year 10/11 Students on the Global Self-Esteem Scale</td>
<td>225</td>
</tr>
<tr>
<td>8.10</td>
<td>Multilevel Models for Year 10/11 Students on the Same-Sex Relations Self-Concept Scale</td>
<td>228</td>
</tr>
<tr>
<td>8.11</td>
<td>Multilevel Models for Year 10/11 Students on the Opposite-Sex Relations Self-Concept Scale</td>
<td>230</td>
</tr>
<tr>
<td>8.12</td>
<td>Multilevel Models for Year 10/11 Students on the Cooperative Teamwork Scale</td>
<td>231</td>
</tr>
<tr>
<td>8.13</td>
<td>Multilevel Models for Year 10/11 Students on the Peer Support Scale</td>
<td>234</td>
</tr>
<tr>
<td>8.14</td>
<td>Multilevel Models for Year 10/11 Students on the Problem Solving Scale</td>
<td>237</td>
</tr>
<tr>
<td>8.15</td>
<td>Multilevel Models for Year 10/11 Students on the Support Seeking Scale</td>
<td>238</td>
</tr>
<tr>
<td>8.16</td>
<td>Multilevel Models for Year 10/11 Students on the Problem Avoidance Scale</td>
<td>240</td>
</tr>
<tr>
<td>8.17</td>
<td>Multilevel Models for Year 10/11 Students on the Open Thinking Scale</td>
<td>242</td>
</tr>
<tr>
<td>8.18</td>
<td>Multilevel Models for Year 10/11 Students on the Coping with Change Scale</td>
<td>243</td>
</tr>
</tbody>
</table>
8.19 Multilevel Models for Year 10/11 Students on the Time Efficiency Scale........................................................................245
8.20 Multilevel Models for Year 10/11 Students on the Stress Management Scale........................................................................247
8.21 Multilevel Models for Year 10/11 Students on the Self-Efficacy Scale......250
8.22 Multilevel Models for Year 10/11 Students for Remaining Outcomes.........................................................................................253
9.1 Frequency and Percentage of Year 7 Student Responses to the Quantitative Program Evaluation Questionnaire ..................................................267
9.2 Frequency and Percentage from Peer Leader Responses to the Quantitative Program Evaluation Questionnaire ..............................272
9.3 Perceived Program Benefits for Year 7 Students: Frequency (and Percentage) of Open-Ended Questionnaire Responses Coded as Positive, Negative and Neutral for Year 7 students (N = 408) and peer support leaders (N = 75)...275
9.4 Perceived Program Benefits for Year 7 Students: Response themes identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions........................................276
9.5 Response Themes Identified Regarding the Perceived Benefits of the Program for Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions .........................................................291
9.6 Response Themes Regarding Perceived Limitations of the Peer Support Program Identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions ..................300
9.7 Frequency (and Percentage) of Responses from Year 7 Students (N = 308) About their Leaders coded as Positive, Negative and Neutral..............311
10.1 Summary of Study 2 Results: Effects of the Intervention on Year 7 Students at Time 2 and Time 3 ........................................................................320
LIST OF FIGURES

5.1. Hierarchical data structure of the present investigation......................... 94

7.1. Model 1: Baseline variance components model for general school self-concept (gnschool)............................................................... 134

7.2. Model 1b: Effect of T1 general school self-concept on post-intervention general school self-concept outcomes........................................ 136

7.3. Model 2: Effect of T1 general school self-concept, time, group, and group x time on post-intervention self-concept scores.................................................. 137

7.4. Change in general school self-concept (Gnschool) for the experimental and control groups over T2 to T3 ................................................................. 138

7.5. Model 3: Aptitude-treatment interaction model for school self-concept.... 139

7.6. Relationship between post-intervention general school self-concept scores (Gnschool) and corresponding T1 scores (T1Gnschool) for the experimental and control groups............................................................... 140

7.7. Change in post intervention pro-bully scores (ProBlly) for the experimental and control groups across T2 and T3 ......................................................... 145

7.8. Change in post intervention pro-victim scores (ProVictim) for the experimental and control groups across T2 and T3 .................................................... 147

7.9. Relationship between post-intervention pro-victim scores (ProVictim) and T1 scores (T1ProVictim) for the experimental and control groups............ 148

7.10. Change in post-intervention self-confidence scores (SlfCon) for the experimental and control groups across T2 and T3 ............................................. 154

7.11. Relationship between post-intervention opposite-sex relations self-concept scores (OppSx) and corresponding T1 scores (T1OppSx) for the experimental and control groups...................................................... 160

7.12. Change in post intervention cooperative teamwork scores (CoTeam) for the experimental and control groups across T2 and T3 .................................... 162

7.13. Relationship between post intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups...................................................... 163

7.14. Changes in post intervention peer support scores (PerSup) for the experimental and control groups across T2 and T3 ............................................. 165

7.15. Relationship between post-intervention support seeking scores (SupSek) and corresponding T1 scores (T1SupSek) for the experimental and control groups...................................................... 169
7.16. Change in post intervention problem avoidance scores (Avoid) for the experimental and control groups across T2 and T3 .................................................. 171
7.17. Change in post intervention time efficiency scores (TmeEfc) for the experimental and control groups across T2 and T3 .................................................. 176
7.18. Change in post-intervention self-efficacy scores (SlfEfc) for the experimental and control groups across T2 and T3 .................................................. 182
7.19. Change in post intervention emotional stability scores (EmtStb) for the experimental and control groups across T2 and T3 .................................................. 184
7.20. Relationship between post-intervention emotional stability scores (EmtStb) and corresponding T1 scores (T1EmtStb) for the experimental and control groups ........................................................................... 185
7.21. Change in post-intervention active involvement scores (TmeEfc) for the experimental and control groups across T2 and T3 .................................................. 186
7.22. Change in post-intervention enjoyment of school scores (EnjSch) for the experimental and control groups across T2 and T3 .................................................. 187
8.1. Model 1: Baseline variance components model for leadership ability (lead) ...................................................................................................................... 202
8.2. Model 1b: Effect of T1 leadership ability on post-intervention leadership ability outcomes .............................................................................................................. 203
8.3. Model 2a: Effect of T1 leadership ability, expvs.c1c2, c1vs.c2, time, expvs.c1c2 x time and c1vs.c2 x time on post-intervention leadership ability scores .......................................................................................... 204
8.4. Change in leadership ability (Lead) for the experimental and control groups over T2 to T3 .......................................................... 205
8.5. Model 2b: Effect of T1 leadership ability, expc2vs.c1, expvs.c2, time, expc2vs.c1 x time and expvs.c2 x time on post-intervention leadership ability scores .......................................................................................... 206
8.6. Model 2c: Effect of T1 leadership ability, c2vs.c1exp, expvs.c1, time, c2vs.c1exp x time and expvs.c1 x time on post-intervention leadership ability scores .......................................................................................... 207
8.7. Model 3: Aptitude-treatment interaction model for leadership ability ...... 208
8.8. Relationship between post-intervention leadership ability scores (Lead) and corresponding T1 scores (T1Lead) for the experimental and control groups .................................................................................................................. 208
8.9. Relationship between post-intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups at T2 and T3 ........................................................................... 232
APPENDICES

A-3. Program activity: High Schools a breeze Ha! (Time management) ............. 381
A-4. Program activity: Helpful hints on managing time and tasks ..................... 382
A-5. Program activity: How to negotiate, Part A ........................................... 383
A-6. Program activity: How to negotiate, Part B ........................................... 386
A-7. Program activity: How to meet a challenge ........................................... 387
B-1. Program activity: A picture paints a thousand words ............................. 391
B-2. Program activity: What’s in a band? .................................................... 392
B-3. Program activity: Choosing my behaviour ............................................ 393
B-4. Program activity: Basic needs ............................................................. 395
B-5. Program activity: Optimistic attitudes ............................................... 396
B-6. Program activity: What is this thing called stress? ................................ 397
B-7. Program activity: Coping with difficult situations .................................. 398
B-8. Program activity: Bouncing back ....................................................... 399
B-9. Program activity: How to solve problems .......................................... 401
B-10. Program activity: Always look on the bright side of life ....................... 402
B-11. Program activity: Who could be a lifebuoy? ....................................... 403
C-1. Demographic characteristics of participants in Study 1 (N = 2,335) ......... 404
D-1. Self Description Questionnaire II - Short ............................................. 405
D-2. Review of Personal Effectiveness Scale .............................................. 407
D-3. Coping Strategy Indicator .................................................................... 409
D-4. Bullying Attitude Scale ......................................................................... 410
D-5. Parent and Peer Support ...................................................................... 411
D-6. School Enjoyment Scale ......................................................... 412
D-7. Year 7 evaluation of the program ........................................... 413
D-8. Leader evaluation of the program .......................................... 414
E-1. Semi-structured interview guide ............................................ 415
F-1. Raw score means for Year 7 experimental and control groups at Time 1, Time 2 and Time 3 .................................................. 416
F-2. Multilevel modelling results for Year 7 students \(N = 930\) ........ 418
F-3. Supplementary multilevel results for Year 7 students, Part A .......... 460
F-4. Supplementary multilevel results for Year 7 students, Part B .......... 468
F-5. Baseline variance components models with time at level 1, individual students at level 2, and peer support group at level 3 .................. 476
G-1. Raw score means for Year 10/11 experimental and control groups at Time 1, Time 2 and Time 3 \(N = 858\) ........................................... 487
G-2. Multilevel models for Year 10/11 students ............................ 489
ABSTRACT

Research suggests that the transition to adolescence and secondary school can be challenging and potentially disruptive to adolescent functioning. Negative changes have most often been sighted in adolescent self-perceptions, attitudes to school, achievement, as well as mental health. Over recent years, school-based peer support programs have been proposed as a potentially strong solution in addressing problems faced by early adolescents on transition to the secondary school context. However, large-scale studies on the effectiveness of peer support programs are currently lacking and those that have been conducted are compromised by methodological problems.

The current investigation sought to address this void in previous research by employing a sound research design to examine the effectiveness of a widely-used secondary school peer support program. The primary purpose of this research was to (a) identify psychometrically sound measurement instruments for use with secondary school students; (b) test the impact of the peer support program on espoused program outcomes and other aspects of students’ psychological well-being and adjustment to the secondary schooling context; (c) extend previous research by examining the effects of serving as a peer support leader on leadership ability and other psychological constructs; and d) identify students’ perceptions of the impact, strengths and weaknesses of the program in order to further strengthen peer support intervention design.

The findings of Study 1 were based on the responses of 2,335 secondary school students enrolled in Years 7, 10 and 11. The results of this study demonstrated that the measures employed in this thesis provided a sound empirical basis upon which the effectiveness of the peer support program could be examined. A sub-sample of the original sample participated in Studies 2 and 3, which aimed to elucidate the effects of the peer support program on Year 7 students and their peer support leaders. These two studies employed a longitudinal design with control groups and baseline data against which to compare the effects. A total of 930 Year 7 students and 858 Year 10/11 students constituted the participant pool for Study 2 and Study 3, respectively. Overall, the results of Study 2 indicated that the program was largely successful in achieving its aims of enhancing Year 7 students’ school self-
concept, school citizenship, sense of self, connectedness, resourcefulness and sense of possibility for the future. Furthermore, the results of Study 3 found that the program led to a variety of benefits for the peer support leaders, including enhancements in leadership ability, school citizenship and peer relations.

A combination of quantitative ($n = 495$) and qualitative methods ($n = 483$) were used in Study 4 to identify students’ personal perspectives of the program. The results of this study confirmed the quantitative findings found in Studies 2 and 3, demonstrating that the peer support program has important benefits for both Year 7 students and their peer support leaders. Study 4 also elucidated that the utilisation of Year 10/11 students and the establishment of small peer support groups are two considerable strengths of the program and provided valuable insights into the ways in which the program could be improved in the future.

These findings have important implications for the provision of programs and techniques employed to address students’ problems following the transition to adolescence and secondary school. In particular, they suggest that peer support programs have the potential to make a significant contribution to schools’ efforts to orchestrate positive outcomes, not only for early adolescents, but also for older students who implement the program.
Peers Helping Peers:
The Effectiveness of a Peer Support Program in Enhancing Self-Concept and Other Desirable Outcomes

Volume 2

by

Louise A. Ellis
B. Psych (Hons.), Macquarie University

A thesis submitted to the School of Psychology, University of Western Sydney, in fulfilment of the requirements for the degree of Doctor of Philosophy

December, 2004

© L. A. Ellis, 2004
Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text. I hereby declare that I have not submitted this material, either in whole or in part, for a degree at this or any other institution.

[Signature]
CONTENTS

1. INTRODUCTION ........................................................................................................... 1

2. LITERATURE REVIEW ............................................................................................... 6

   Introduction .................................................................................................................. 6
   The Impact of Transition to Adolescence and Secondary School: An Overview of Research Evidence ............................................................................................................. 6
   Impact of Transition Upon Self-Esteem and Self-Concept ........................................ 7
   Impact of Transition Upon Attitude to School and Academic Achievement ........... 10
   Impact of Transition Upon Psychological Functioning ......................................... 12
   Summary: The Impact of Transition to Secondary School Upon Adolescents . 14
   Unravelling the Factors that Affect Adjustment .................................................... 14
   Coping Resources ....................................................................................................... 15
   Social Support ........................................................................................................... 16
   Expectancies for Success ......................................................................................... 17
   School Connectedness ............................................................................................. 19
   Summary: Factors that Affect Adjustment ............................................................... 20
   The Nature of Student’s Social Environment ....................................................... 20
   School Settings Affecting Transition .................................................................... 22
   Home Settings Affecting Transition .................................................................... 23
   Summary: School and Home Settings Affecting Transition ................................. 24
   Programs Designed to Ease the Transition ............................................................ 25
   Orientation Programs ............................................................................................. 25
   Extended Programs ................................................................................................. 26
   Skills Training ........................................................................................................... 27
   Peer Support Programs ............................................................................................ 28
   Summary: Programs Designed to Ease the Transition ......................................... 31
The Potential Power of Peer Support Programs.......................... 31

Benefits for Peer Leaders.................................................. 32

Implications for the Present Investigation............................ 33

Summary ............................................................................. 35

3. PROGRAM BACKGROUND AND DESCRIPTION..................... 36

Introduction...................................................................... 36

Origins of the Peer Support Foundation.................................. 36

Characteristics of the Secondary School Peer Support Program ....... 37

Overview of the Secondary School Peer Support Program............ 37

Goals and Objectives of the Program........................................ 38

  School competence...................................................... 38
  School citizenship....................................................... 38
  Sense of self ............................................................... 38
  Connectedness.............................................................. 39
  Resourcefulness.......................................................... 39
  Sense of possibility ..................................................... 39

Detailed Description of the Program...................................... 39

Orientation Module.......................................................... 40

  Session one.................................................................. 40
  Session two.................................................................. 41
  Session three ................................................................ 42
  Session four ................................................................. 43

Positive Action Module....................................................... 44

  Session one.................................................................. 44
  Session two.................................................................. 45
  Session three ............................................................... 46
  Session four ................................................................. 48
  Session five ................................................................ 49
  Session six .................................................................. 49
  Session seven .............................................................. 51
  Session eight .............................................................. 51

Features for Successful Implementation................................. 52

Teacher Roles and Training.................................................. 53

  The role and training of the coordinating teacher .................. 53
  The role and training of facilitating teachers......................... 53
Statement of the Hypothesis................................................................. 68
Statement of the Research Question .............................................. 69
Rationale for Hypothesis................................................................. 69
Rationale for Research Question.................................................... 69
Study 4: Quantitative and Qualitative Student Evaluation of the Program ...... 69
Aims ......................................................................................... 69
Statement of the Research Question .............................................. 69
Rationale for Research Question.................................................... 69
Summary ..................................................................................... 70

5. METHODOLOGY ....................................................................... 71

Introduction .............................................................................. 71

Participants .............................................................................. 71
Study 1 ...................................................................................... 72
Study 2 ...................................................................................... 72
Study 3 ...................................................................................... 73
Study 4 ...................................................................................... 74

Quantitative Measures.................................................................. 75
Self-Concept.............................................................................. 75
Life Effectiveness .................................................................... 77
Coping .................................................................................... 78
Perceptions of Bullying ............................................................ 79
Parent and Peer Support ............................................................ 80
School Enjoyment .................................................................... 81
Student Evaluation of the Peer Support Program ......................... 81
Student Background .................................................................. 82
Pilot Study of the Quantitative Measures..................................... 82
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative Measures</td>
<td>83</td>
</tr>
<tr>
<td>Student Evaluation of the Peer Support Program</td>
<td>83</td>
</tr>
<tr>
<td>Focus Discussion Groups</td>
<td>84</td>
</tr>
<tr>
<td>Procedure</td>
<td>85</td>
</tr>
<tr>
<td>Questionnaire Administration</td>
<td>85</td>
</tr>
<tr>
<td>Focus Group Discussions</td>
<td>86</td>
</tr>
<tr>
<td>Program Implementation</td>
<td>86</td>
</tr>
<tr>
<td>Research Design</td>
<td>87</td>
</tr>
<tr>
<td>Study 1</td>
<td>87</td>
</tr>
<tr>
<td>Study 2</td>
<td>87</td>
</tr>
<tr>
<td>Study 3</td>
<td>88</td>
</tr>
<tr>
<td>Study 4</td>
<td>88</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>89</td>
</tr>
<tr>
<td>Data Analysis for Study 1</td>
<td>89</td>
</tr>
<tr>
<td>Reliability of the measurement instruments</td>
<td>89</td>
</tr>
<tr>
<td>Factor structure of the measurement instruments</td>
<td>89</td>
</tr>
<tr>
<td>Age-related structural differences</td>
<td>90</td>
</tr>
<tr>
<td>Missing data</td>
<td>91</td>
</tr>
<tr>
<td>Data Analysis for Study 2 and Study 3</td>
<td>91</td>
</tr>
<tr>
<td>Introduction to multilevel modelling</td>
<td>92</td>
</tr>
<tr>
<td>Baseline variance components model or intercept-only model</td>
<td>94</td>
</tr>
<tr>
<td>Variance components model with explanatory variables</td>
<td>95</td>
</tr>
<tr>
<td>Multilevel, longitudinal path models</td>
<td>96</td>
</tr>
<tr>
<td>Data transformations and interaction effects</td>
<td>96</td>
</tr>
<tr>
<td>Estimation procedure</td>
<td>97</td>
</tr>
<tr>
<td>Significance of parameters</td>
<td>97</td>
</tr>
<tr>
<td>Missing data</td>
<td>97</td>
</tr>
<tr>
<td>Examining the impact of the peer support program on Year 7 students</td>
<td>98</td>
</tr>
<tr>
<td>Examining the impact of the program on peer support leaders</td>
<td>100</td>
</tr>
<tr>
<td>Data Analysis for Study 4</td>
<td>101</td>
</tr>
<tr>
<td>Quantitative component</td>
<td>101</td>
</tr>
<tr>
<td>Qualitative component</td>
<td>101</td>
</tr>
<tr>
<td>Summary</td>
<td>102</td>
</tr>
</tbody>
</table>
6. STUDY 1 RESULTS: PSYCHOMETRIC PROPERTIES OF THE MEASUREMENT INSTRUMENTS ........................................ 103

Introduction ........................................................................................................... 103
Overview of Analyses .......................................................................................... 104
Psychometric Properties of the SDQII – S .......................................................... 105
  Internal Consistency Estimates ........................................................................ 105
  Factor Structure ............................................................................................... 106
  Factor Invariance Across Age ......................................................................... 108
Psychometric Properties of the ROPE ................................................................ 110
  Internal Consistency ....................................................................................... 110
  Factor Structure ............................................................................................. 110
  Factor Invariance Across Age ....................................................................... 112
Psychometric Properties of the CSI-S ................................................................. 114
  Internal Consistency ....................................................................................... 114
  Factor Structure ............................................................................................. 115
  Factor Invariance Across Age ....................................................................... 116
Psychometric Properties of the APRI-A ............................................................. 117
  Internal Consistency ....................................................................................... 117
  Factor Structure ............................................................................................. 117
  Factor Invariance Across Age ....................................................................... 118
Psychometric Properties of the Support Scales .................................................. 120
  Internal Consistency ....................................................................................... 120
  Factor Analysis ................................................................................................ 120
  Factor Invariance Across Age ....................................................................... 121
Psychometric Properties of the Enjoyment of School Scale ............................... 123
  Internal Consistency ....................................................................................... 123
  Factor Analysis ................................................................................................ 123
Factor Invariance Across Age ................................................................. 123
Summary of Reliability and CFA Results .................................................. 125
Multifactorial Analysis Including all Instruments ...................................... 126
Factor Structure ..................................................................................... 126
Factor Correlations ................................................................................ 126
Factor Invariance Across Age ................................................................. 127
Summary ................................................................................................. 129

7. STUDY 2 RESULTS: EFFECTS OF THE INTERVENTION ON YEAR 7 STUDENTS ................................................................. 130
Introduction ............................................................................................ 130
Overview of Statistical Analyses ............................................................... 131
Preliminary Analyses .............................................................................. 132
School Self-Concept .............................................................................. 134
Hypothesis 2.1: Effects on General School Self-Concept ......................... 134
Hypothesis 2.2: Effects on Verbal Self-Concept ..................................... 140
Summary of Results for School Self-Concept .......................................... 142
School Citizenship .................................................................................. 143
Hypotheses 2.3 and 2.4: Effects on Perceptions of Bullying ....................... 143
Hypothesis 2.5: Effects on Honesty/Trustworthiness .............................. 148
Summary of Results for School Citizenship ............................................. 150
General Sense of Self .............................................................................. 152
Hypothesis 2.6: Effects on Self-Confidence .......................................... 152
Hypothesis 2.7: Effects on Global Self-Esteem ....................................... 154
Summary of Results for General Sense of Self ..................................... 155
Connectedness ...................................................................................... 157
Hypotheses 2.8 and 2.9: Effects on Peer Relations ................................. 157
Hypothesis 2.10: Effects on Cooperative Teamwork .............................. 160
Hypothesis 2.11: Effects on Peer Support .................................................. 163
Summary of Results for Connectedness .................................................. 165
Resourcefulness .................................................................................. 167
Hypotheses 2.12 to 2.14: Effects on Coping Strategies .......................... 167
Hypothesis 2.15: Effects on Open Thinking ........................................... 172
Hypothesis 2.16: Effects on Coping with Change .................................. 173
Hypothesis 2.17: Effects on Time Efficiency .......................................... 174
Hypothesis 2.18: Effects on Stress Management .................................... 176
Summary of Results for Resourcefulness ............................................. 178
Sense of Possibility ........................................................................... 180
Hypothesis 2.19: Effects on Self-Efficacy ............................................. 180
Effects on Remaining Outcomes ......................................................... 183
Summary of Results for Remaining Outcome Variables .................... 187
Effects at the Peer Support Group Level ............................................. 192
Summary .......................................................................................... 194

8. STUDY 3 RESULTS: EFFECTS OF THE INTERVENTION ON PEER SUPPORT LEADERS ........................................ 197
Introduction ..................................................................................... 197
Overview of Statistical Analyses ......................................................... 197
Preliminary Analyses ......................................................................... 198
Effects of the Intervention on Leadership Ability .............................. 201
Hypothesis 3.1: Leadership Ability ..................................................... 201
Summary of Results for Leadership Ability ....................................... 209
School Self-Concept ......................................................................... 210
Effects on Global School Self-Concept ............................................. 210
Effects on Verbal Self-Concept .......................................................... 212
Summary of Results for School Self-Concept .................................... 214
School Citizenship ........................................................................................................... 215
Effects on Perceptions of Bullying ............................................................................... 215
Effects on Honesty/Trustworthiness ........................................................................... 218
Summary of Results for School Citizenship ................................................................. 220
Sense of Self................................................................................................................... 222
Effects on Self-Confidence .......................................................................................... 222
Effects on Global Self Esteem ...................................................................................... 223
Summary of Results for General Sense of Self ......................................................... 225
Connectedness ............................................................................................................ 227
Effects on Peer Relations ............................................................................................ 227
Effects on Cooperative Teamwork .............................................................................. 230
Effects on Peer Support ............................................................................................... 233
Summary of Results for Connectedness ..................................................................... 234
Resourcefulness .......................................................................................................... 236
Effects on Coping Strategies ....................................................................................... 236
Effects on Open Thinking ............................................................................................ 240
Effects on Coping with Change ................................................................................... 242
Effects on Time Efficiency .......................................................................................... 244
Effects on Stress Management .................................................................................... 246
Summary of Results for Resourcefulness ................................................................... 247
Sense of Possibility ....................................................................................................... 249
Effects on Self-Efficacy ............................................................................................... 249
Effects on Remaining Outcomes ............................................................................... 251
Summary ........................................................................................................................ 259

9. STUDY 4: QUANTITATIVE AND QUALITATIVE STUDENT EVALUATIONS OF THE PROGRAM ........................................................................... 261

Introduction .................................................................................................................... 261
Historical Background to the Emergence of Mixed Methods Research and Rationale for this Approach in the Current Study .................................................. 262

Overview of Research Methods for Study 4 .................................................. 264
  Quantitative Methods ............................................................................ 264
  Qualitative Methods ............................................................................ 264

Quantitative Results .................................................................................. 266

Year 7 Evaluations of the Program ......................................................... 266
Year 7 Evaluations of their Peer Support Group ..................................... 268
Year 7 Evaluations of their Leaders ....................................................... 268
Leader Evaluation of Program Organisation .......................................... 269
Leader Evaluation of Program ............................................................... 270
Leader Evaluation of Value to Self ........................................................ 271

Summary of Quantitative Results ............................................................ 273

Qualitative Results: Perceived Benefits for Year 7 Students ............... 274
Preliminary Open-Ended Questionnaire Results ................................ 274
Preliminary Examination of Content Analysis Results ....................... 275

Higher Order Theme 1: Student Connectedness .................................. 276
  Open-ended questionnaire items ......................................................... 276
  Focus group discussions .................................................................. 279
  Summary ......................................................................................... 281

Higher Order Theme 2: Problem-Solving Ability .................................. 281
  Open-ended questionnaire items ......................................................... 281
  Focus group discussions .................................................................. 282
  Summary ......................................................................................... 283

Higher Order Theme 3: Sense of Self ..................................................... 283
  Open-ended questionnaire items ......................................................... 283
  Focus group discussions .................................................................. 284
  Summary ......................................................................................... 285

Higher Order Theme 4: Sense of Possibility ........................................ 285
  Open-ended questionnaire items ......................................................... 285
  Focus group discussions .................................................................. 286
LIST OF TABLES

5.1 Characteristics of Study 2 Participants in the Experimental Group \(n = 452\) and Control Group \(n = 478\) ................................................................. 73

5.2 Characteristics of Study 3 Participants in the Experimental Group \(n = 99\), Control Group 1 \(n = 412\) and Control Group 2 \(n = 347\) ......................... 74

5.3 Summary Description of the SDQII-S Scales .............................................. 76

5.4 Summary Description of the ROPE scales .................................................. 78

5.5 Summary Description of the CSI scales ..................................................... 79

5.6 Summary Description of the APRI-A scales .............................................. 80

5.7 Summary Description of the Support Scales Used in the Present Study ...... 81

5.8 Orthogonal Contrast Sets Employed in Study 3 ........................................ 101

6.1 Internal Consistency Coefficients for the SDQII-S at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each of the Self-Concept Scales .................................................. 106

6.2 Factor Structure for and Correlations among the SDQII-S Scales .......... 107

6.3 Invariance Tests Across Age for the SDQII-S ............................................. 108

6.4 Internal Consistency Coefficients for the ROPE at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Life Effectiveness Scale ........................................ 111

6.5 Factor Structure for and Correlations among the ROPE Scales ............... 112

6.6 Invariance Tests Across Age for the ROPE ................................................. 113

6.7 Internal Consistency Coefficients for the CSI-S at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Coping Scale .......................................... 114

6.8 Factor Structure for and Correlations among the CSI-S Scales ............... 115

6.9 Invariance Tests Across Age for the CSI-S ................................................ 116

6.10 Internal Consistency Coefficients for the APRI-A at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Bullying Attitude Scale .......................................... 117

6.11 Factor Structure for and Correlations among the APRI-A Scales .......... 118

6.12 Invariance Tests Across Age for the APRI-A ........................................... 119
6.13 Internal Consistency Coefficients for the Support Scales at Time 1 for Year 7 students, Year 10/11 students, and the Total Sample, as well as the Number of Items within Each Support Scale................................................................. 120

6.14 Factor Structure for and Correlations among the Support Scales.............. 121

6.15 Invariance Tests Across Age for the Support Scales .................................. 122

6.16 Invariance Tests Across Age for the Enjoyment of School Scale .............. 124

6.17 Correlations among the 31 factors (n = 2,229)........................................ 128

7.1 Model Testing for Differences in T1 Scores............................................... 133

7.2 Multilevel Models for Year 7 Students on the Verbal Self-Concept Scale ... 141

7.3 Multilevel Models for Year 7 Students on the Pro-bully Scale ................... 144

7.4 Multilevel Models for Year 7 Students on the Pro-Victim Scale ................. 146

7.5 Multilevel Models for Year 7 Students on the Honesty/Trustworthiness Scale....................................................................................................................... 149

7.6 Multilevel Models for Year 7 Students on the Self-Confidence Scale....... 152

7.7 Multilevel Models for Year 7 Students on the Global Self-Esteem Scale... 155

7.8 Multilevel Models for Year 7 Students on the Same-Sex Relations Self-Concept Scale........................................................................................................ 157

7.9 Multilevel Models for Year 7 Students on the Opposite-Sex Relations Self-Concept Scale........................................................................................................ 158

7.10 Multilevel Models for Year 7 Students on the Cooperative Teamwork Scale ......................................................................................................................... 161

7.11 Multilevel Models for Year 7 Students on the Peer Support Scale............ 164

7.12 Multilevel Models for Year 7 Students on the Problem Solving Scale ...... 168

7.13 Multilevel Models for Year 7 Students on the Support Seeking Scale....... 169

7.14 Multilevel Models for Year 7 Students on the Problem Avoidance Scale .. 170

7.15 Multilevel Models for Year 7 Students on the Open Thinking Scale........ 172

7.16 Multilevel Models for Year 7 Students on the Coping with Change Scale . 174

7.17 Multilevel Models for Year 7 Students on the Time Efficiency Scale ...... 175

7.18 Multilevel Models for Year 7 Students on the Stress Management Scale... 177

7.19 Multilevel Models for Year 7 Students on the Self-Efficacy Scale............ 180
8.19 Multilevel Models for Year 10/11 Students on the Time Efficiency Scale ........................................................................................................... 245

8.20 Multilevel Models for Year 10/11 Students on the Stress Management Scale ........................................................................................................... 247

8.21 Multilevel Models for Year 10/11 Students on the Self-Efficacy Scale ........................................................................................................... 250

8.22 Multilevel Models for Year 10/11 Students for Remaining Outcomes ........................................................................................................... 253

9.1 Frequency and Percentage of Year 7 Student Responses to the Quantitative Program Evaluation Questionnaire ........................................................................................................... 267

9.2 Frequency and Percentage from Peer Leader Responses to the Quantitative Program Evaluation Questionnaire ........................................................................................................... 272

9.3 Perceived Program Benefits for Year 7 Students: Frequency (and Percentage) of Open-Ended Questionnaire Responses Coded as Positive, Negative and Neutral for Year 7 students (N = 408) and peer support leaders (N = 75) ........................................................................................................... 275

9.4 Perceived Program Benefits for Year 7 Students: Response themes identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions ........................................................................................................... 276

9.5 Response Themes Identified Regarding the Perceived Benefits of the Program for Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions ........................................................................................................... 291

9.6 Response Themes Regarding Perceived Limitations of the Peer Support Program Identified from Year 7 Students and Peer Support Leaders in the Open-Ended Questionnaire and Focus Group Discussions ........................................................................................................... 300

9.7 Frequency (and Percentage) of Responses from Year 7 Students (N = 308) About their Leaders coded as Positive, Negative and Neutral ........................................................................................................... 311

10.1 Summary of Study 2 Results: Effects of the Intervention on Year 7 Students at Time 2 and Time 3 ........................................................................................................... 320
LIST OF FIGURES

5.1. Hierarchical data structure of the present investigation ............................................. 94

7.1. Model 1: Baseline variance components model for general school self-concept (gnschool) ................................................................. 134

7.2. Model 1b: Effect of T1 general school self-concept on post-intervention general school self-concept outcomes ........................................... 136

7.3. Model 2: Effect of T1 general school self-concept, time, group, and group x time on post-intervention self-concept scores .................................. 137

7.4. Change in general school self-concept (Gnschool) for the experimental and control groups over T2 to T3 ...................................................... 138

7.5. Model 3: Aptitude-treatment interaction model for school self-concept ....... 139

7.6. Relationship between post-intervention general school self-concept scores (Gnschool) and corresponding T1 scores (T1Gnschool) for the experimental and control groups ........................................ 140

7.7. Change in post intervention pro-bully scores (ProBly) for the experimental and control groups across T2 and T3 .................................................... 145

7.8. Change in post intervention pro-victim scores (ProVictim) for the experimental and control groups across T2 and T3 ......................................... 147

7.9. Relationship between post-intervention pro-victim scores (ProVictim) and T1 scores (T1ProVictim) for the experimental and control groups ........ 148

7.10. Change in post-intervention self-confidence scores (SlfCon) for the experimental and control groups across T2 and T3 ........................................ 154

7.11. Relationship between post-intervention opposite-sex relations self-concept scores (OppSx) and corresponding T1 scores (T1OppSx) for the experimental and control groups ............................................. 160

7.12. Change in post intervention cooperative teamwork scores (CoTeam) for the experimental and control groups across T2 and T3 .......................... 162

7.13. Relationship between post intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups ........................................................................ 163

7.14. Changes in post intervention peer support scores (PerSup) for the experimental and control groups across T2 and T3 ......................................... 165

7.15. Relationship between post-intervention support seeking scores (SupSek) and corresponding T1 scores (T1SupSek) for the experimental and control groups................................. 169
7.16. Change in post intervention problem avoidance scores (Avoid) for the experimental and control groups across T2 and T3 ................................. 171

7.17. Change in post intervention time efficiency scores (TmeEfc) for the experimental and control groups across T2 and T3 .................................. 176

7.18. Change in post-intervention self-efficacy scores (SlfEfc) for the experimental and control groups across T2 and T3 ........................................ 182

7.19. Change in post intervention emotional stability scores (EmtStb) for the experimental and control groups across T2 and T3 .......................... 184

7.20. Relationship between post-intervention emotional stability scores (EmtStb) and corresponding T1 scores (T1EmtStb) for the experimental and control groups ........................................ 185

7.21. Change in post-intervention active involvement scores (TmeEfc) for the experimental and control groups across T2 and T3 ................................ 186

7.22. Change in post-intervention enjoyment of school scores (EnjSch) for the experimental and control groups across T2 and T3 ................................ 187

8.1. Model 1: Baseline variance components model for leadership ability (lead) .............................................................................................. 202

8.2. Model 1b: Effect of T1 leadership ability on post-intervention leadership ability outcomes ............................................................................. 203

8.3. Model 2a: Effect of T1 leadership ability, expvs.c1c2, c1vs.c2, time, expvs.c1c2 x time and c1vs.c2 x time on post-intervention leadership ability scores ............................................................................. 204

8.4. Change in leadership ability (Lead) for the experimental and control groups over T2 to T3 ............................................................. 205

8.5. Model 2b: Effect of T1 leadership ability, expc2vs.c1, expvs.c2, time, expc2vs.c1 x time and expvs.c2 x time on post-intervention leadership ability scores ............................................................................. 206

8.6. Model 2c: Effect of T1 leadership ability, c2vs.c1exp, expvs.c1, time, c2vs.c1exp x time and expvs.c1 x time on post-intervention leadership ability scores ............................................................................. 207

8.7. Model 3: Aptitude-treatment interaction model for leadership ability ........ 208

8.8. Relationship between post-intervention leadership ability scores (Lead) and corresponding T1 scores (T1Lead) for the experimental and control groups ............................................................................. 208

8.9. Relationship between post-intervention cooperative teamwork scores (CoTeam) and T1 scores (T1CoTeam) for the experimental and control groups at T2 and T3 ...................................... 232
APPENDICES

A-3. Program activity: High Schools a breeze Ha! (Time management) ........ 381
A-4. Program activity: Helpful hints on managing time and tasks .............. 382
A-5. Program activity: How to negotiate, Part A ........................................ 383
A-6. Program activity: How to negotiate, Part B ........................................ 386
A-7. Program activity: How to meet a challenge ......................................... 387
B-1. Program activity: A picture paints a thousand words .......................... 391
B-2. Program activity: What’s in a band? .................................................... 392
B-3. Program activity: Choosing my behaviour ............................................ 393
B-4. Program activity: Basic needs ............................................................ 395
B-5. Program activity: Optimistic attitudes ................................................. 396
B-6. Program activity: What is this thing called stress? .............................. 397
B-7. Program activity: Coping with difficult situations .............................. 398
B-8. Program activity: Bouncing back ....................................................... 399
B-9. Program activity: How to solve problems ........................................... 401
B-10. Program activity: Always look on the bright side of life ..................... 402
B-11. Program activity: Who could be a lifebuoy? ...................................... 403
C-1. Demographic characteristics of participants in Study 1 (N = 2,335) ....... 404
D-1. Self Description Questionnaire II - Short .......................................... 405
D-2. Review of Personal Effectiveness Scale ............................................. 407
D-3. Coping Strategy Indicator ............................................................... 409
D-4. Bullying Attitude Scale ................................................................. 410
D-5. Parent and Peer Support ............................................................... 411