The socio-economic and psychological determinants of student academic outcomes in Papua New Guinea

Volume I

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Bachelor of Psychology (Honours)

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- KISIM SAVE EMI ROT BLONG MI LONG BIHAIN TAIM -

EDUCATION IS THE KEY TO MY FUTURE
In Memory of my friend Kevin

– who died from malaria, at the age of 17, in early 2005
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, in whole or in part, for a degree at this or any other institution.

___________________________________
Genevieve F. Nelson
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ABSTRACT

Papua New Guinea (PNG), a country characterised by tremendous linguistic, environmental, and cultural diversity, has experienced a history of educational reform and political and social turbulence. Attempts to inform educational interventions and successful policy change in PNG have been erratic. In addition, there is a paucity of sound methodological research which has impeded effective change. As such, little is known about the key determinants of academic outcomes for PNG students.

The purpose of the current study was to test a comprehensive cross-cultural model of the relation of a suite of psycho-social constructs to academic outcomes for PNG students from urban, rural, and village educational settings. This model examined the influence of socio-economic status, parent education, future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation upon PNG students’ academic outcomes. In order to test this model in PNG, three main studies were conducted. The first study ($n=917$) aimed to examine the psychometric properties of relevant instrumentation, and the differences in students’ endorsement of future goals, perceived instrumentality, motivation, self-concept, and self-regulation, across different groups in PNG. This study found the instrumentation to be valid and reliable for use in PNG, as well as structurally invariant across gender, grade, and region groups. Gender, grade, and region profile differences were also found for each of the five psychological variables.

The second study ($n=917$) aimed to examine the relations between key socio-economic and psychological factors, and the impact that these variables had upon achievement and effort outcomes. The results firstly highlighted
students’ socio-economic status and parent education as being positive predictors of student outcomes. Next, village-oriented future goals and perceived instrumentality, mastery and social motivation, and domain specific academic self-concept, were all found to be significant, positive predictors of students’ achievement and effort scores. Furthermore, authority future goals and perceived instrumentality and performance motivation were found to be negative predictors of student outcomes.

Finally, the third study (n=52) aimed to illuminate and extend the results of the quantitative studies with qualitative data from students, teachers, and parents. This study found that these groups emphasised the importance of future goals, perceived instrumentality, motivation, and self-regulation as predictors of students’ educational experiences, and they highlighted the underlying relations between these variables and student outcomes. Results also highlighted a number of additional psychological, linguistic, and socio-cultural factors, as serving important roles in students’ educational experiences.

Findings of the current investigation were interpreted within the cross-cultural framework of the student model that was utilised. The findings have important implications for our understanding of the key determinants of student achievement and effort within PNG, but also for future cross-cultural research examining related determinants within other Indigenous, developing, and Indigenous majority countries. Furthermore, the findings have implications for future research, practice, and policy interventions within PNG, and provide guidance for the development of culturally sensitive and appropriate interventions to aid the achievement and effort of students living in PNG.
CHAPTER ONE
INTRODUCTION

Research into the various determinants of student achievement in cross-cultural settings is consistently growing and expanding. This research, however, remains scarce and limited in cross-cultural settings where the participants are Indigenous, the majority population group, and are from developing countries, and little is known about maximising achievement for such groups. The current investigation was designed to address these limitations by capitalising on recent advances in psychological research in order to elucidate the psycho-social determinants of student achievement in a unique, cross-cultural setting, to further our understanding of the relations between these constructs for an Indigenous, majority population group, from a developing country. Thus, the current research is based in one such cultural setting, Papua New Guinea (PNG), a country that is characterised by extreme cultural, environmental, and linguistic diversity. The goal of the study is therefore to expand the body of knowledge in educational psychology to this cross-cultural setting and to identify the main socio-economic and psychological predictors of PNG students’ learning and achievement processes.

In order to gain a more complete understanding of the underlying mechanisms of student achievement, this research uses a model which encapsulates and investigates the influences of broader socio-economic variables on student outcomes, as well as the combined, and directional, effects of students’ future goal orientations, perceived instrumental value of schooling, motivational goal orientations, academic self-concept, and self-regulatory
learning processes, on these outcomes. Previously, many of these psychological constructs have been investigated in isolation or in combination with a small number of other variables (e.g., Marsh, 1993; McInerney, 2003; Dowson, 2004). The new model, based on the work of McInerney (2007) and others (Miller & Brickman, 2004; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996), however, suggests that it is the combined effect of these socio-economic and psychological variables that ultimately influence student educational outcomes, and that all must be examined in order to gain a complete understanding of student learning in cross-cultural settings.

In addition to the advantages gained by examining the combined influence of these psychological variables, many of these variables have never before been investigated in a cultural setting defined as Indigenous, containing a majority population, and having developing world status. Although some of these constructs have been investigated amongst minority groups within developed nations (e.g., Craven & Marsh, 2004; McInerney, Yeung, & McInerney, 2006), the current study seeks to expand this understanding to a unique cross-cultural setting, and to highlight the most important psycho-social determinants of PNG students’ learning.

The model used in this study was proposed by McInerney (2007), which builds upon the theorising and models of Miller and Brickman (2004), and Miller et al. (1996). In order to test this model in PNG, the current investigation employs a synergistic mixed-method research design and is comprised of three studies. The overarching purpose of these studies is to test the cultural usefulness of this model of student learning for an Indigenous majority group in PNG by:
(a) Examining the cultural validity and reliability of a range of psychometric instruments reflecting the student learning model in the PNG context (Study 1);

(b) Utilising psychometrically sound quantitative instrumentation to identify PNG students’ future goals, perceived instrumental value of schooling, motivational goals, self-concept, and self-regulation profiles across gender, grade, and region (Study 1);

(c) Identifying the key socio-economic (external) and psychological (internal) determinants of PNG students’ achievement and effort academic outcomes (Study 2);

(d) Examining the similarities and differences in these external and internal psycho-social determinants across gender, grade, and region groups in PNG (Study 2);

(e) Illuminating the relations between the socio-economic, psychological, and educational outcome variables, with student, teacher, and parent qualitative data (Study 3); and

(f) Identifying other key determinants of PNG students’ educational experiences with student, teacher, and parent qualitative data (Study 3).

In achieving these purposes, the study employed rigorous and culturally sensitive quantitative and qualitative research methods.

To begin, the following two chapters present a review of the literature relevant to the purposes of this study. Specifically, Chapter 2 will present an historical summary of the literature to date on the state of education in PNG and
on current known influences of PNG student educational outcomes. Chapter 3 will then examine the literature comprising the development of McInerney’s (2007) revised model of student achievement. Specifically, past research on the socio-economic influences of student outcomes and the five psychological variables pertinent to the current study will be presented, and a case for the simultaneous investigation of these determinants will be proposed.

In Chapter 4, the investigation’s aims, hypotheses, and research questions will be outlined, and a rationale will be presented for each. These will be based on a thorough review of the literature and where past research is not strong enough to support predictive hypotheses, research questions will be posed. Next, Chapter 5 will outline the methods to be employed in the current study and will explain the particular steps involved in mixed-method quantitative and qualitative research studies. The chapter will summarise all relevant information pertaining to the study’s participants, research settings, instrumentation, and ethical research procedures. Furthermore, the rigorous statistical techniques of confirmatory factor analyses and structural equation modelling employed in the current study will be outlined.

The results for the qualitative and two quantitative studies will be presented in the next three chapters. Specifically, Chapter 6 will present the findings of the psychometric property testing of the quantitative instrumentation, the invariance testing of the instrumentation factor structure across groups in PNG, and the differences across gender, grade, and region, in students’ endorsement of the five psychological variables in McInerney’s model. Chapter 7 will then examine the relations between the socio-economic factors, the psychological factors, and PNG students’ academic outcomes. Key paths will be
highlighted for future research and intervention. Then, Chapter 8 will analyse and present qualitative data from students, teachers, and parents, discussing each of the key components of McInerney’s model of student achievement, and other relevant influences of students’ educational experiences in PNG.

Chapter 9 will then discuss and draw together the findings of the data analyses presented in the previous three chapters. It will highlight the key influences of student outcomes that were identified for PNG students, and will provide suggestions for future research and interventions for educators, researchers, and policy makers. Finally, Chapter 10 will summarise the findings of the investigation and present concluding thoughts and statements.

Ultimately, the goal of the investigation is to unearth the key factors that contribute to the achievement of academic outcomes among PNG students. When controllable, internal determinants of student achievement and effort are identified, it is then possible to influence a students’ learning with appropriate and culturally relevant educational interventions. This study will highlight the appropriate targets for intervention within the areas of students’ socio-economic status, parent education, future goal orientations, perceived instrumentality, motivational goals, self-concept, and self-regulatory processes. In doing this, the study will highlight the key internal and external determinants of student educational outcomes in this new setting, provide a focus for future cross-cultural research, and provide suggestions for interventions within PNG educational practice and policy.
CHAPTER TWO

AN OVERVIEW OF THE HISTORY OF EDUCATION AND RESEARCH
EXAMINING STUDENT ACHIEVEMENT IN PAPUA NEW GUINEA

Introduction

Education in Papua New Guinea (PNG) has experienced a tumultuous and uneven history characterised by decades of restructure and controversy as the positions of power controlling education have shifted from missionaries to colonial governments, and more recently to a post-colonial PNG Department of Education. Throughout the course of these disruptive shifts, the PNG education system has experienced limited funding and resources, and a lack of qualified and appropriately paid educators. Furthermore, the PNG education system has had to combat an ever-increasing attitude of ambivalence towards the utility of education in student and family lives, as well as an overwhelming number of the ‘educated unemployed’. This has too often resulted in the reinforcement of a widely held view that there is no valid link between the formal education system and a promising future. Research in PNG, investigating constructs that contribute to attitudes, aspirations, and achievement at school, has also not served to strengthen PNG education, as it is characterised by inconsistent findings, is predominantly dated and therefore obsolete, and is fragmented. This is unfortunate because if education is to play the effective and important role in Papua New Guineans’ lives that it has so often shown to in numerous other cultures, it is necessary for researchers, educators, and policy designers alike, to gain a full understanding and appreciation of those factors that contribute to student achievement and engagement.
This chapter provides an outline of the history of education in PNG and discusses some of the major reforms that have been undertaken resulting in the modern PNG education system of today. The chapter then discusses three main approaches that can be employed when conducting cross-cultural research in educational settings such as PNG. Finally, a brief summary of the small amount of research that has been conducted in PNG is presented, followed by the implications for the present investigation.

The Papua New Guinea Context

Papua New Guinea is a country of extreme geographic, linguistic, and cultural diversity. It is the largest nation in the South Pacific and is officially classified as a developing nation by the World Bank (2007). In the year 2000, the population of PNG was estimated to be approximately 5.2 million, with 40% of the population being under the age of 15 years (McDonald, 2005; United Nations Development Program, 2004). Life expectancy at birth is just 53 years and based on the 2004 Human Development Index, PNG ranks 133 among the 177 nations listed.

Unemployment rates in PNG are extremely high. A total of 86.9% of Papua New Guineans are engaged in agriculture or agriculture-related activities, in which 80 to 85% is subsistence farming based predominantly on female labour (Browne & Scott, 1989; Ollson, Apelis, & Wasleski, 1985; Zeegers, 2005). The commercial sector can only provide 4000 jobs a year to all groups of Papua New Guineans, leaving 24 in every 25 children who graduate from high school each year unable to obtain paid employment (Bamford, 1995). As such there are 400
times more children leaving school than there are jobs available for them (Doyle, 1990).

In an assessment of the state of poverty in PNG in 2004, the World Bank found that the levels of poverty had dramatically increased. Their projections of poverty measures indicated that the proportion of the PNG population living in poverty had increased from 37.5% in 1996 to approximately 54% in 2003. In addition to overall poverty standards, the report examined education and health indicators in PNG. They found that in the year 2000, only 56% of the population aged 10 and above were literate and only 38% had completed Grade 6. This was reflective of a modest improvement in education outcomes during the period 1996-2000. However, health indicators revealed a deterioration in health services and the World Bank reported a decline in life expectancy, infant mortality, and maternal and child health. Furthermore, HIV/AIDS rates increased during this period contributing to increased disease in adults and children. In 1999, AIDS became the leading cause of death in PNG’s general hospitals and predictions exist that over the next 5 to 10 years AIDS will become pandemic in PNG and on a similar scale to the HIV crisis in Sub-Saharan African communities (Mond, 1999). Malaria is also a further health crisis that is endemic in PNG and has greatly influenced mortality rates. Malaria is the leading cause of all outpatient visits in PNG and the third-leading cause of hospital admissions and deaths.

Despite these devastating statistics, the governing bodies and people of PNG have attempted to create positive change towards restoring economic growth and reducing poverty. One such avenue of change has been attempted in the area of education. The following section provides an overview of the history and transformation of the education system in PNG.
History of Education in Papua New Guinea

As one of the last nations in the world to develop a modern formal education system, PNG has experienced a number of significant dilemmas in educational development, planning, and reform, as well as combating a widely held ambivalent view towards the utility of education. This ambivalence has been shaped not only by PNG’s traditional village subsistence-based cultural history, but also largely by their ongoing attempts to maintain self-worth within a context of disparate power and restricted educational and vocational opportunities. PNG students nation-wide have had to deal with frustrated expectations as international aid and local business and economic development coordinators, fail to create job opportunities for the “educated unemployed” (Demerath, 1999). In this section an overview is provided of the changes made to the education system in PNG from the times of pre-colonial missionary influence to the establishment of post-colonial, modern structures found in PNG today.

Characteristics of Traditional Papua New Guinea Education

The modern education system of PNG is embedded in a 40,000-year-old Melanesian history. Before colonisation, the Indigenous peoples of PNG were predominantly concerned with pursuing their basic needs of life, food, and shelter (Tivinarlik & Wanat, 2006). They were community-oriented and the main interests of their small communities were that of sharing and looking after each others’ welfare. Whenever personal wealth was obtained, this was normally held in trust for one’s family, clan, and village, rather than keeping it for oneself (Narokobi, 1983), and thus land and other valuable resources were shared, owned, and controlled by whole communities (Tivinarlik & Wanat).
These community-oriented values and ways of operating were, and continue to be, expressed through what is known as the ‘wantok system’. The word wantok, when split into its two components, ‘wan’ and ‘tok’ (meaning ‘one’ and ‘talk’ in English), implies the notions of ‘sharing and sameness’ alongside the notion of ‘verbal communication’. Thus, the term wantok refers to the “bond of people with a basic, kinship community, speaking the same tongue, living in the same place, and sharing values” (Tivinarlik & Wanat, 2006, p. 4). These kinship communities served, and continue to serve, important roles in the determination of many practices influencing social, educational, and governing systems throughout PNG. Within these traditional wantok systems was the existence of ‘big men’ who were, and again continue to be, responsible for the governing responsibilities of a community. Traditionally, big men were widely known and often feared for their abilities in magic and sorcery as well as their accomplishments as warriors and hunters (Rogers, 1970). Thus the title of ‘big man’ is often earned through hard work, fighting, and wealth attainment for the village. The big man is responsible for the protection of his wantok community and is involved with the important decision making processes and customs of the village (Tivinarlik & Wanat).

In addition to adopting traditional wantok systems, many communities in PNG employed their own traditional forms of education and learning. According to McLaughlin and O’Donoghue (1996), the main purposes of pre-colonial, traditional forms of education were to gain knowledge for physical development and to enhance one’s development of and proficiency in certain physical skills and abilities. Such physical skills and abilities were taught through various learning processes and were considered vital to the survival of a community.
Secondary to this emphasis on *physical* knowledge, traditional education practices also emphasised the cognitive, behavioural, and moral development of students. This included modelling and teaching knowledge about honesty, concern for others, and obedience to authority, and was normally done via ‘inspirational’, ‘revelationary’, and ‘transmissional’ pathways. The main knowledge types were behavioural in nature, were focused on livelihood and practicality, were adult oriented, and were often unique to each village and community.

*The Effects of Colonisation on Educational Reform and Development*

European powers had been visiting many parts of PNG since the fifteenth century, however official European colonisation occurred when the Dutch took control of the western half of the island, Germany colonised the northern portion of the island, and the British settled in the southern regions of the country. Britain’s protectorate of Papua was passed to Australian control in 1905, and the German’s possession of the territory of New Guinea fell to Australia in World War I. The two Papua New Guinea territories were administered jointly after 1949 by Australia and PNG was given self-government in 1973. On the 16th of September 1975, PNG gained independence from Australia (Rannells, 1995).

In the mid-nineteenth century European missionaries arrived in PNG and introduced a Western education system. The construction of missionary schools was based on the belief that a formal education system was needed in PNG for successful modernisation, self-government, and development. The missionaries also viewed education and literacy as intrinsic elements in the transformation of the Indigenous population from paganism to Christianity (McKeown, 2006).
During the years between colonisation and independence the purposes of
education changed from the religious instruction purposes of the missionaries, to
the colonial administrators’ desires to see economic growth and development, to
the post-colonial notion of education creating ‘Integral Human Development’,
which was, and continues to be encouraged by the many aid and other non-
governmental organisations in PNG (McKeown).

Post World War I, PNG was administered by an authoritarian Australian
colonial administration until 1975, when independence was declared. Australia
actively introduced a formal education system and a government Department of
Education was established in 1946. Prior to the 1960s, Australia used schools to
develop an ‘educated elite’ to take over the colonial bureaucracies in PNG
(Demerath, 1999). This resulted in the rapid expansion of secondary and tertiary
education at the expense of ‘universal primary education’, which was being
implemented and enforced in a number of other developing countries (Webster,
2000). Furthermore, due largely to the failure of international aid to support
socio-economic development and the failure of local business and economic
development coordinators to create jobs, PNG found itself in the midst of a crisis
of having an abundance of the ‘educated unemployed’ (Demerath). Thus, to
prevent ensuing problems (which have been documented in other countries with
large proportions of educated unemployed; Dore, 1976; Weeks, 1993)
educational planners turned their attention to investing in universal primary
education. Universal primary education dramatically changed enrolment statistics
to reflect the familiar pyramidal structure of many developing countries, in
which a majority of students are enrolled in primary school and a minority
participate in tertiary education (Avalos, 1993). This, however, meant that the
majority of students who began school would never get the opportunity to participate in tertiary studies. This was complicated further by the formal education system becoming increasingly competitive in that a limited number of students were permitted to attend secondary school, college, other tertiary institutions, and technical schools. National examinations were introduced and administered by the Department of Education at the end of students’ sixth year of schooling, and quotas based on achievement success ensured that only one-third of students would progress to the seventh grade. Indeed, enrolment statistics in PNG have shown that only 1.5% of students who begin Grade 1 go on to complete Grade 12 (Avalos). In order to counteract this trend, recent attempts have been made to increase student participation in all levels of education.

In 1995, the PNG Government introduced a *National Education Plan* in order to: (a) improve the quality of education; (b) restructure the pre-existing primary, community, and tertiary school configurations; (c) increase the number of children attending schools; and (d) prepare PNG people for work and life after formal education. Whilst the old education system included community schools (Grades 1 to 6), provincial high schools (Grades 7 to 10), and national high schools (Grades 11 and 12) (Hopkins, et al., 2005), the new restructured education system consisted of elementary schools (Prep, Elementary 1 and 2), primary schools (Grades 3 to 8), provincial high schools (Grades 9 and 10), and national high schools (Grades 11 and 12). The PNG Government also clearly set out their goals in implementing such a system. These were “to develop universal primary education, to create a literate population, and to develop individuals’ skills for life” (AusAID, 2000). Furthermore, the education system began implementing ‘Education for All’ policies (Demerath, 1999) which eliminated
the screening examination at the end of Grade 8 in an attempt to maximise the number of students entering secondary schools and completing Grade 10.

**PNG Education Today**

*Nature of the Curriculum*

The new levels of schooling in PNG are unique but also reflect the general trend towards Western traditions of schooling as a result of educational reform policies. Elementary school is based on the idea of a culturally relevant system of education. Schools are community-based and instruction is provided in the local vernacular language. The syllabus is relatively flexible and is focused on community relevant learning (Badenoch, 2004). Primary education covers Grades 3 to 8 and is divided into lower primary (Grades 3 to 5) and upper primary (Grades 6 to 8), both utilising separate curricula. In lower primary school, students progressively move from their vernacular language to English, the national language of instruction. Upper primary students are expected to be fluent in English, although support is still given in the vernacular language if required. The main subjects taught in primary school are language, mathematics, science, making a living, social science, arts, and personal development. These subject modules continue and expand throughout secondary school (Grades 9 to 12), but are currently under review (Badenoch, 2004).
The Role of Language in Education

The issue of language use and translation is pertinent when considering education in PNG today. PNG has an Indigenous population consisting of more than 1,000 tribes (McLaughlin & O’Donoghue, 1996). Due to the almost complete geographical isolation of these tribes, there are 832 unique and distinctive languages across PNG (Grimes, 2000). This represents approximately one-quarter of the world’s languages (Wroge, 2002). These languages represent unique cultures, often include multiple dialects, and are based on oral traditions. In the midst of this vast array of languages, PNG has adopted two lingua francas as national languages, and one official language. The national languages are Tok Pisin (often referred to as Pidgin English) and Hiri Motu, whilst the official language is English. English is the language used in government and commercial settings and is also the medium of educational instruction post elementary school. One of the main adjustments to be made with the introduction of a formal, Western education system was that education was to be conducted in a new official language – English. The acquisition of literacy skills in English was thought to produce an educated population who could perform effectively on international levels of commerce and trade necessary for the country’s economic development (Zeegers, 2005). A second purpose for this shift was the attempt to foster a sense of nationhood and to provide a common linguistic ground to the disparate groups across PNG. However, this actual adjustment has been referred to as the forced shift of the PNG people from the stone age to a modern, electronic age (Kiki, 1963), and has resulted in mixed outcomes. For example, consider the case of two children living in PNG – one living in an urban region, witnessing constant and rapid change, the other living in a remote village area.
The first child will predominantly develop an understanding of the *lingua franca*, *Tok Pisin*, but may not know their community vernacular, known as *Tok Ples*, nor might they have a full grasp on the English language. The second child will gain an understanding of the vernacular, or *Tok Ples*, they are raised in, and will often understand *Tok Pisin*, but they will not be exposed to English. When these two children are faced with the same structures of an imposed education system, results will be varied. When instruction is delivered in English, both students will face difficulties of learning a second language and applying it to their immediate studies. When the educational activities are administered in the vernacular, the child who understands *Tok Pisin* only, is cut off from traditional ways of learning in this non-formal system (Zeegers, 2005). If teachers utilise *Tok Pisin*, then the resulting difficulties of administering education through the use of a broken version of English, will arise for both children. Hence, debate continues as to the best and most appropriate language to be used as the language of instruction.

In a comprehensive study of the PNG education system, Matane (1986) did not question the use of English as the medium of instruction. He emphasised the value in having a unifying language such as English that fosters communication and collaboration amongst cultural groups in PNG. He did, however, emphasise the importance of using bilingual instruction to facilitate one’s learning of and proficiency in English. This viewpoint was adopted by the Secretary of Education (1990) who argued for literacy in the vernacular as well as in English. However, the purposes cited for this were not simply to assist in the language transition learning process for students. Confronted by the extreme unemployment statistics (approximately 82%) and the need for educated students to be in a position to return to their home villages, the Secretary believed that
fluency in one’s vernacular was vital. This was largely to ensure that post education, students would be in a position to continue a subsistence-based living and to perform socially and culturally valuable tasks back in their home communities (Zeegers, 2005). Thus, there has been much controversy surrounding the official language of instruction in education in PNG.

Since the reform in 1995, teachers have been instructed to provide education in the local vernacular during elementary school, and to then make the transition to English in primary school. Whilst there has been no data collected on the number of schools adhering to these guidelines, it is has been noted that some schools in PNG do not support this restructure. Some schools in urban areas who enrol students from a vast range of cultural areas refuse to use any language other than English in their instruction as they believe it to be the only unifying language available. Alternatively, some schools in remote village regions often employ teachers who do not come from the same cultural or geographical location. These teachers, therefore, do not speak the same vernacular language as the community, and the students have often never been exposed to the English language. Many of these schools employ Tok Pisin as a means of bridging the language barriers. Hence, the language debate continues in PNG and as yet research has not determined what the best solution is for the language of instruction across such a diverse, linguistic nation.

Modern Education Influences

Many of the modern influences of social, health, and educational practices in PNG today, stem from overseas government aid interventions and locally based non-government organisations. Since independence in 1975, the
Australian and PNG Governments have worked together to enhance the quality of life in PNG. The majority of Australia’s overseas aid budget is delivered to PNG and a large proportion of that is being invested in education (Commonwealth Budget, 2000). As a component of this aid, the Australian Government provides opportunities for PNG students to study in Australia. However, the number of students availing themselves of this opportunity has risen slowly, from 3,200 in 1982 to 4,200 in 2000 (Australian Bureau of Statistics, 2002).

A further component of Australian aid money is designated to a variety of projects aimed towards curriculum evaluation and reformation, teacher training, in-service courses, and resource development (AusAid, 2000). However, despite good intentions, far too much foreign aid to Pacific island nations has been lost to corruption, mismanagement, and incompetence (Anderson, 2003). Despite some promising reformation changes, schools in PNG remain extremely under-resourced, and teachers are under-trained, under-paid, and in short supply (Nelson, McInerney, & Craven, 2004).

**Section Summary**

The history and transformation of the delivery of education in PNG has dealt with many obstacles including poverty, language difficulties, and limited post-education employment opportunities. Despite these barriers and the often perceived futility of education in PNG, it is a widely accepted view that education systems within a society are instruments of social change, and hold intrinsic value in the social, economic, and political elements of a nation (Zeegers, 2005). Reductions in educational standards ultimately have serious
implications for countries, and it is vital that education is viewed as one of the most productive investments in providing answers to the needs of a country and its people (Kenehe, 1982). In order for this to occur in PNG, there is a need for a greater understanding of what makes students engage and achieve in their schooling in the context of international advances in cross-cultural research. This is discussed in the following section.

Cross-Cultural Research

The Etic – Emic Debate

A substantial amount of research has investigated cross-cultural forms of intelligence and compared the similarities and differences between a Western form of intelligence and a specific cultural form of intelligence (Dasen, 1984; Kim, 2000). This particular type of research is most often grounded in the ongoing debate in cross-cultural psychology, between etic and emic approaches to research.

The etic, or universalist approach, aims to discover abstract, nomothetic, and general laws of human functioning (Kim, 2000; Koch & Leary, 1985) that exist and are applicable across all cultures. Cultural differences within this approach can be explained in two ways. First, cultural differences can be considered to be “superficial contextual factors [which are] deemed unimportant since the underlying mechanism is considered to be universal” (Kim, p. 266). Alternatively, cultural differences are believed to exist due to different cultures being ranked according to their different stages of evolutionary development. Thus, a single, universal theory of stage development can be used to describe human functioning across all cultures, depending on what stage the particular
culture is at (Kim). However, the *emic, or contextualist*, approach rejects these
claims that all psychological theories are universal and can be applied cross-
culturally. Instead, this approach emphasises that theories are ethnocentric,
biased, and culture-bound (Berry, 1984). Proponents of this view believe that
“each culture should be understood from its own frame of reference, including its
own ecological, historical, philosophical, and religious context” (Kim, p. 266).

Cross-Cultural, Cultural, and Indigenous Psychologies

**Cross-Cultural Psychology**

According to Yang (2000), three types of psychology have stemmed from
the *etic-emic* debate – cross-cultural, cultural, and Indigenous psychologies.
Cross-cultural psychology is synonymous with the *etic* approach and is by far the
most prominently used model in cross-cultural research (Yang). This approach
was first introduced in the 1960s as a way to test Western theories in other
cultures. It has been defined as “the study of similarities and differences in
individual psychological functioning in various cultural and ethnic groups”
(Berry, Poortinga, Segall, & Dasen, 1992, p. 2). Cross-cultural psychology
employs a natural science methodology and has three main goals: (a) to test the
generality of existing psychological theories in other cultures; (b) to discover
psychological variations between different cultures within the framework of a
psychological theory; and (c) to generate a universal psychology (Yang).

**Cultural Psychology**

Cultural psychology offers an alternative perspective to that of cross-
cultural psychology and is synonymous to the *emic* approach of gaining
knowledge and understanding. Cultural psychology grew out of a dissatisfaction with a purely *etic* approach to research, and its methodology reflects an integration of psychology and anthropology (Greenfield, 1997). Cultural psychology attempts to understand an individual’s psychological functioning, within the culture in which it developed. Its methodology rejects the natural science framework adopted by cross-cultural and mainstream psychology, and rather employs a ‘human’ or ‘cultural’ science framework. Cultural psychology questions a purely *etic* approach to understanding and develops its’ knowledge systems *within* each specific culture (Yang, 2000). An example of the distinct contrast between cultural and cross-cultural psychology, came from a study by Dasen (1984), who investigated the differences between an *etic*, Piagetian approach and an *emic* approach to understanding African intelligence. Dasen outlined the fallacies involved in applying Western norms and value judgements to non-Western, developing countries, and emphasised the need for a balanced, culturally sensitive ‘social intelligence’. Unlike the Piagetian perspective which placed importance on cognitive development, attention, and memory, cultural approaches to intelligence have found that Africans emphasise politeness, respect, service, initiative, and responsibility, as the most important features of an intelligent person (Dasen). Although Piagetian intelligences (e.g., memory, literacy, and ‘school intelligence’) were still recognised amongst African communities and schools, this was balanced by a more traditional, social, and cultural form of intelligence, emphasising the importance of appropriately combining the two approaches to studying intelligence and achievement in cross-cultural settings.
**Indigenous Psychology**

The third type of psychology – Indigenous psychology – is an integration of both cross-cultural and cultural psychologies. Yang (2000) notes the main goal of Indigenous psychology to be that of “developing a scientific knowledge system that effectively reflects, describes, explains, or understands the psychological and behavioural activities in their native contexts in terms of culturally relevant frames of reference and culturally derived categories and theories” (pp. 245-246). This integrationist approach recognises the importance of integrating both the context and content of psychological knowledge (Kim, 2000). The Indigenous approach examines a progression from the level of the society, to the Indigenous population, and finally to universal human truths. This latter stage is reached by integrating all lower-level Indigenous psychologies. An Indigenous psychological approach employs both cultural *emic* and cross-cultural *etic* methodologies, and seeks to integrate both local and universal explanations in the search for knowledge (Yang). The current investigation predominantly utilised a *cross-cultural* approach in that existing instrumentation and theoretical models were used as a framework for understanding PNG learning and achievement. The study however did also include some *cultural* approaches in that the investigation sought to understand the unique, PNG-specific factors that also emerged as playing significant roles in the learning experiences of PNG students.

**Methodology Employed in PNG**

A variety of the three methodological approaches have been employed in PNG when examining education and student achievement. Predominantly,
studies have employed a cultural psychology, examining those aspects that contribute specifically to PNG students’ achievement and engagement (Demerath, 1999, 2000; Sengi, 1995; Vulliamy, 1987;). Some studies have also employed a cross-cultural approach to examining PNG achievement and have made comparisons between students from PNG and students from Western cultures (Nelson et al., 2004). The results and implications of some of these studies are discussed in the following section.

**Overview of Research Examining Academic Achievement and Student Engagement in PNG**

The majority of educational research in PNG has examined the influences of external factors, such as the school and education system, in influencing a student’s engagement and achievement in the classroom. In addition to school influences, some research has investigated family and parent, as well as internal psychological student factors, as serving important roles in predicting student outcomes. These three areas will be discussed in the section below.

**School Factors Influencing Achievement in PNG**

Educational research in PNG has elucidated further knowledge about some factors that underpin student achievement. Vulliamy (1987) found that schools are influenced by both internal and external factors and emphasised that academic success can be explained by what goes on within the school as well as the external factors influencing a school. In his study of PNG schools and students he highlighted a number of factors that were found to be positive influences of student achievement. He emphasised good staff morale, strict but
flexible leadership and decision making, approachable headmasters, well-maintained school facilities, and the effective communication of expectations as the most important factors contributing to the overall academic success of a school.

Similarly, Weeks (1990) proposed that PNG students’ academic performance is determined by intake, process, and output factors, such as the quality of student intake, the actors and activities within the school, and the quality of the school’s graduates. In his study of these external school related influences of education, Weeks stressed the importance of effective democratic leadership, safe and stable social environments, and positive academic climates as being conducive for the pursuit of high standards within PNG schools.

Furthering these ideas, Sengi (1995) examined aspects of the school environment that contributed to high academic success in PNG. He compared two schools in PNG – a high and a low achieving school – and emphasised seven internal organisational dimensions as being related to school effectiveness and achievement. Characteristics of the high achieving school included: (a) active, efficient, and democratic leadership; (b) a definitive set of clear-cut goals which are communicated effectively; (c) safe, peaceful, and tranquil environmental surroundings; (d) clear, but flexible lines of communication and authority; (e) clearly communicated staff and student learning expectations; (f) high time-on-task allowance and extra-curricular tutoring and activities; and (g) regular in-service staff-development and training sessions. Characteristics of a poor performing school included inactive and inefficient leadership, a lack of consensus of educative goals, an anti-social, unsafe environment, and a lack of extra-curricular activities. Thus, a range of factors has been identified as
contributing to school effectiveness and the academic success of students in PNG, and researchers in PNG have emphasised the importance of understanding the mechanisms that occur within the school as a source to understanding and improving school success (Vulliamy, 1987).

**Familial / Community Factors Influencing Achievement in PNG**

In addition to external school factors, some research in PNG has examined the influence of the family and community on student academic achievement and engagement. During a period of vital curriculum restructuring in PNG, Avei (1996) stressed the importance of designing curriculum and classroom practices deeply rooted in the “community’s existence” and “intricately woven into [their] daily routine” (p. 125). Routines from the traditional education system in PNG, such as indirect learning and observation through village experiences, are still widely practiced within families and communities. Problems in student achievement and engagement, however, often arise due to the inconsistency between their experiences at school and their experiences at home. As reported by Avei, often the teacher and parent expectations of students are very different. Whilst teachers are preparing students with skills and knowledge for life in the workforce, parents and communities often emphasise the importance of preparing their children for village-based subsistence lifestyles, where the child can contribute to the life and prosperity of the family.

In a more recent study of the influences of student interest and motivation in school, Hopkins et al. (2005) found that patterns in students’ performance at school were influenced by the types of knowledge that was valued and utilised in the students’ home and classroom environments and the resulting differences
between the two. Their findings suggested that the ‘metaphorical distance’
between students’ home and classroom environments plays a significant role in
the successful learning of literacy skills. Consistent with findings by Mel (1995),
they concluded that interventions are vital for connecting these home and school
environments in order to make both experiences culturally and practically
meaningful.

Swatridge (1987) investigated the degree of parental involvement in PNG
students’ academic lives. He suggested that parents were often not involved in
their child’s schooling due to three reasons. These included the physical and
cultural distance between the school and the home, parents’ traditional values
and attitudes, and ambivalence families and communities hold towards the value
of education in their own and their child’s lives. This lack of parental
involvement meant that students did not have another source to go to for
assistance, to gain further knowledge, or to gain other forms of indirect support,
which have all been shown to lead to higher rates of student disengagement and
low achievement (Demerath, 2000). Similarly, in an ethnographic study of
students and families from the Manus province in PNG, Demerath (1999) found
that the parents and communities of the students were enforcing ‘detached
approaches’ and ‘fatalistic attitudes’. He found that parents’ investment (e.g.,
time, energy, money) in their children’s education was minimal and that they did
not take an active role in the activities of the school, nor did they impose curfews
or study guidance. Many students then internalised their parents’ ambivalent
attitudes about the value of formal education. Thus, research in PNG has
identified the role of the family and community and specific parental interest and
involvement as being important in predicting student achievement and engagement.

**Student Factors Influencing Achievement in PNG**

The research presented thus far has focused on the organisational factors of the school and family and community-related beliefs as contributing to student achievement in PNG. However, when examining the influence of the characteristics of the students themselves, research in PNG is extremely limited and there are mixed findings regarding academic engagement and achievement amongst PNG students.

Demerath (1999, 2000) examined why students were not engaging and achieving in their schooling. He proposed a cross-cultural phenomenon, which attempted to provide a cultural basis for the many instances of PNG students’ academic disengagement and resistance. He speculated that students perceive school success and high academic achievement as the result of internalising a Western ideology of individualism. Resultant status differences, between high and low achievers, then imperil a high achiever’s solidarity within their village community and creates an anti-academic climate within the school context.

Combined with students’ ever-increasing acceptance of the limited availability of post-educational job opportunities, Demerath believed that the meanings students construct about schooling could potentially serve to limit their opportunities in life. He found that high achievers were labelled as acting ‘extra’, ‘expensive’, and ‘white’ and were led to feel ashamed about the effort they apply to their studies by their low-achieving peers. Demerath uncovered the moral judgements that students were making about appropriate selves, social relations, and future aspirations, and stressed that these were powerful influences negatively shaping
their academic engagement. Demerath (1999) also found that a majority of students in the Manus province of PNG were implicitly preparing themselves for a life of subsistence in the village. Those, however, who did have dreams and aspirations to undertake education and work in the formal economy, would often hide their desires in order to avoid ridicule and disapproval. Thus, there exists a heterogeneity of desires and identities characteristic of students being educated in post-colonial PNG. As students, parents, and teachers strive to ‘maintain worth’ within this context of disparate power and lack of post-educative opportunities, they find creative ways to integrate the ‘modern’ and the ‘traditional’. When promises of links between education, modernisation, and success go unfulfilled, the result in PNG is often ambivalent attitudes, hidden aspirations, and a satisfaction with a subsistence lifestyle. Whilst there is nothing inherently wrong with this satisfaction, in fact it is actually encouraged by many educators and policy makers who understand the realities of the employment situation in PNG, if such a satisfaction contributes to disengagement and low performance then interventions are necessary to prevent this detrimental outcome from occurring.

A small amount of research has also investigated student factors influencing educational achievement in PNG by employing cross-cultural methodologies. Nelson et al. (2004) compared a combination of village and urban students in PNG with students from Australia on their motivational goal orientations. They employed a cross-cultural methodology and validated a motivation instrument that was initially constructed and validated on Western samples (McInerney, 2000). They found that students in PNG were more globally, intrinsically, and socially motivated than students in Australia. They suggested that despite limited educational and occupational opportunities,
students from PNG still hold strong motivational goal orientations. Similarly, in their study of student literacy rates and engagement in PNG schools, Hopkins et al. (2005) found that children from all regions included in their investigation (including international, suburban, settlement, and village regions), were highly motivated to read and had high interest levels in the literary content of their reading materials.

**Section Summary**

To summarise, some research has examined the various influences of student educational outcomes in PNG, including the role played by the external school environment, the family and community, and the internal characteristics of the children themselves. To date, research paradigms that utilise both cross-cultural and cultural methodologies, have not been extensively employed in PNG educational research despite the obvious ways research would benefit by implementing such approaches (McLaughlin & O’Donoghue, 1995). The findings presented above generate a number of important questions for future research. Where does this then leave the role of education in the lives of Papua New Guineans? How are students still motivated to achieve when the common attitude towards the utility of education is ambivalent? Why should students continue to strive for success when the majority of school leavers will never use their education in the workplace? How do students still manage to put in effort in the midst of an anti-academic school climate? How do educators, teachers, and policy makers encourage students to value education and continue to strive to achieve? To address these issues, it is vital for research to be both culturally sensitive and driven by psychological and motivational models. The final section
presented below outlines the implications of such models for the present investigation.

Implications for the Present Investigation

As education in PNG enters a new stage of development, it is vital to identify the mechanisms involved in student engagement and achievement. So far, research has mainly focused on factors within the PNG classroom, by examining the functions of the classroom and the teacher that influence student achievement. Few PNG studies have examined the effect of parental and student attitudes on engagement and achievement, and the underlying motivational and cognitive processes involved in the learning process. In comparison to the scope of educational and psychological research in developed and predominantly Western countries, there is an alarming gap in our understanding of the same processes at work in PNG. In order to address this, it is vital for researchers to employ methodologies that combine grounded psychological theory and knowledge, with culturally sensitive approaches to investigation.

Therefore, the current investigation aims to address these issues by employing Indigenous psychological methods combining both etic and emic approaches to research, making it possible to examine the validity and appropriateness of universal psychological constructs, as well as highlighting those factors which are unique to student learning in PNG. As such, the current study will employ a combination of quantitative and qualitative research methods, obtaining data from students, parents, and teachers. In order to identify the psycho-social constructs that influence students’ achievement, two quantitative studies will attempt to utilise a combination of existing and newly
developed instrumentation to measure psychological factors of PNG students that have previously been shown to influence student educational outcomes. The qualitative study will attempt to elucidate further school, family, and student influences on academic achievement in PNG. This synergistic blend of methodological approaches is anticipated to produce a more nuanced understanding of the important influences of PNG students’ educational experiences. The study is unique in that it not only examines a range of psychological and social variables and their influence upon student education, but that it also employs methods obtaining data from multiple viewpoints utilising multi-method techniques. The study is also noteworthy in that it is the first of its kind to utilise these Indigenous methodologies among relatively remote and traditional people in PNG.

Summary

This chapter provided an overview of the social and educational contexts for the present investigation, approaches to cross-cultural psychology, and research pertaining to student achievement and engagement in PNG. Accepting recommendations about appropriate cross-cultural research methodology, the chapter outlined that the current study will employ a mixed-method research design and that it is the first of its kind to obtain data in PNG from multiple viewpoints examining a broad range of psycho-social influences of educational outcomes. In the next chapter the theory underpinning the present investigation is discussed.
CHAPTER THREE
AN INTEGRATIVE MODEL OF THE PSYCHOLOGICAL AND SOCIO-CULTURAL INFLUENCES ON PNG STUDENT EFFORT AND ACHIEVEMENT

Introduction

A large amount of research investigating the underlying processes that influence student academic achievement in school has been conducted. The majority of this research has been based in Western, developed countries, and lately, this body of research has been extended to minority students, who often live in underprivileged circumstances within these developed education systems. This body of research has often focused on the similarities and differences between minority and mainstream students in areas such as racial identity, psychological well-being, motivation, self-concept, and learning strategies. A vast number of theories have been formulated in an attempt to explain firstly, how these psychological constructs influence student academic achievement, and secondly, why it is that so often, minority students, in comparison to mainstream students, fail to engage and achieve at school.

Whilst addressing minority students’ achievement is important, similar crippling problems are evident in education systems in developing nations whereby large numbers of populations are failing to receive an appropriate education. Yet, more research is needed to examine these psychological constructs in developing countries to elucidate why it is that so often students from developing countries fail to engage and achieve in the school setting. The current investigation aims to contribute to existing research by extending recent
advances in education and psychology to a developing country (PNG) in order to
further elucidate factors that influence PNG students’ achievement and
engagement in their schooling. By integrating theoretical models of educational
achievement from Western countries and minority settings, the present study also
aims to develop a new theoretical model of potential salience to PNG and other
developing nations.

The purpose of the current chapter is to present an overview of: (a) the
theoretical perspectives underpinning key psychological variables that are
hypothesised to influence student engagement and achievement; (b) past research
that has examined the relations between these variables and student outcomes
across different educational and cross-cultural settings; and (c) the implications
of this body of evidence for the present investigation. The first section discusses
key external and psychological variables that have been examined in cross-
cultural minority educational settings in order to identify those factors that might
be important predictors of the educational experiences of those students living in
developing countries.

**Academic Achievement in Minority Settings**

A considerable amount of research has examined the psychological
processes underpinning student academic achievement in minority settings.
Researchers have examined constructs such as racial identity and psychological
well-being (Arroyo & Zigler, 1995), parental status and beliefs about education
(Okagaki & Frensch, 1998; Okagaki & Sternberg, 1993), group identification
(Hogg & Turner, 1987), and ‘racelessness’ (Fordam & Ogbu, 1986) as all
contributing to minority students’ academic achievement and engagement. A
significant portion of these factors contributing to student engagement and achievement, involve the disconnection of an individual with their natural heritage and genetic identity. Minority students attempting to achieve academically in mainstream society have often been reported to strive for a balance between their in-group identity needs and their personal and perhaps ‘academic’ desire to have positive relations within the larger, mainstream society (Berry, 1984). This, however, has often resulted in feelings of alienation, anxiety, and a loss of identity (Berry & Annis, 1974; Fordham & Ogbu, 1986), as well as mixed academic results (Arroyo & Zigler, 1995).

Arroyo and Zigler (1995), drawing together Fordham (1988) and Fordham and Ogbu’s (1986) theories and past research in minority education, suggested that there are four main influences on minority student engagement and achievement. The following section outlines these four factors, provides evidence as to how they affect achievement in minority settings, and by examining the similarities between minority and developing settings, speculates as to how these influences may also be at work in developing countries.

**External Factors: Educational Inequity**

The literature has shown that inequities in the social and educational systems in minority settings have contributed significantly to student disengagement and underachievement. Borman and Rachuba (2001) suggest there are three school (external) factors that may serve to be risk factors of minority students’ hope for academic success. These are the deliverance of inadequate educational resources, the failure to create a supportive school climate, and the institutionalisation of low academic expectations.
**Inadequate Resources**

According to the School-Effects Approach hypothesis (Coleman et al., 1966) school funding, resources, and student peers are all important predictors of student academic outcomes. Research has established a negative relation between limited resources in the school environment and student academic achievement (Masten, 1994; Wang, Haertel, & Walberg, 1995). Furthermore, Wang et al. (1995) demonstrated that students who attend schools that are: under-resourced; dominated by students who underachieve and are economically disadvantaged; and predominantly made up of minority students, are placed at increased risk of academic failure. By contrast, ‘at-risk’ minority students who attend well-funded and well-equipped schools are more likely to achieve positive academic outcomes. Thus, the lack of access to educational resources faced by economically disadvantaged schools appears to be detrimental to student academic outcomes.

**School Climate**

Consistent findings are also apparent in the literature about the importance of certain characteristics in the school environment and their positive influence on student engagement and achievement. The existence of caring and supportive teachers, a safe and orderly school environment, and opportunities for students to become meaningfully and productively involved and engaged in the school contribute to successful schooling outcomes for both Western and minority students (Borman & Rachuba, 2001; Henderson & Milstein, 1996; Wang et al., 1995). Further positive characteristics of the school that help create a positive school climate and hence result in positive student academic outcomes
include implementing strong principal leadership, clear school wide goals, monitoring student progress, and maximising learning time (Levine & Lezotte, 1995).

**Academic Expectations**

In addition to resource access and supportive school climates, positive academic expectations for students, combined with the establishment of effective partnerships between students’ home and school environments, have been shown to predict positive minority student outcomes (Borman & Rachuba, 2001). Consistently, the literature has shown that a major predictor of academic success is whether or not students’ parents hold high academic expectations for their children (Clark, 1983; Ford, 1993; Ford & Thomas, 1997). In a study examining the family context of minority, low socio-economic status (SES), ‘black’ students, Clark found that the high achieving students in the group had parents who were optimistic, set high and realistic expectations for their children, set clear goals, and had positive parent-child relations characterised by nurturance, support, respect, trust, and open communication. Furthermore, teacher expectations have been shown to serve a facilitating role in predicting student achievement and engagement. Atkinson (2000), in a summary of the literature, concluded that positive teacher expectations, encouragement, and communication all predict minority student achievement. Furthermore, research has posited that low teacher expectations contribute to students holding a negative self-image, which in turn, contributes to their lack of engagement and success in school (Murnane, 1975; Williams & Muehle, 1978).
Section Summary

In summary, these three external factors, access to resources, supportive school climate, and teacher and parent academic expectations have all been shown to contribute to the engagement and achievement of students. The next section outlines the second important influence of student outcomes according to Fordham and Ogbu’s (1986) research – students’ perceived view of the futility versus the usefulness of education.

The Futility of Education

The many inequities in minority settings’ social and educational systems have often led minority students to view academic performance as futile (Arroyo & Zigler, 1995). According to Ogbu (1978, 1982), minority students often reject academic effort because they have learned from their parents that “success in school does not necessarily lead to success in life” (Arroyo & Zigler, 1995, p. 904). Community and societal factors have been documented to serve a role in student engagement and achievement in school. Students living in areas rife with unemployment, crime, and lack of post-educative vocational opportunities often become ambivalent about the education process and fail to engage with schooling activities. Research has often drawn this link between lack of opportunities for minority children after school and student disengagement (Arroyo & Zigler, 1995) and recently it has been examined in the developing world (Demerath, 2000). Through his study of students living in Manus, PNG, Demerath found that students’ awareness of the paucity of educational and post-educational opportunities resulted in habitual patterns of thinking about the efficacy of knowledge and education. He found that this perception would often
lead to academic disengagement, underachievement, and a complacent attitude about seeking vocational opportunities, and students would often report simple desires to return to their village subsistence-based lifestyle. These attitudes about the futility of education, however, were often encouraged by and drawn from the students’ family and socio-cultural surroundings. This research highlights the influence that key external factors have on student engagement and achievement outcomes. The next section examines the role that cultural identification serves in student educational processes.

**Cultural Identification**

The third factor contributing to poor student outcomes in minority settings is personal, cultural identification. Fordham and Ogbu (1986) claim that by purposefully failing to succeed in school, minority students demonstrate their distinctiveness from and opposition to the dominant white, European culture. By doing this, minority students are able to maintain their solidarity with their own culture and prevent themselves from integrating the demands of a Western-based school environment with those of their own native culture. Alternatively, high achieving minority students, who strive for academic success would often have to integrate mainstream Western values into their attitudes and behaviours and would often sever ties with their cultural community in order to achieve this. Fordham and Ogbu termed this concept ‘racelessness’ and found that although these students performed well in school, they were also at a greater risk for negative psychological consequences, such as alienation, depression, and anxiety. Ogbu (1997) suggested that these student attitudes towards education are often shaped by external factors such as racism and social inequity, which
ultimately result in feelings of ambivalence towards the utility of education, and hence academic disengagement (Schwartz, 2003).

Perhaps unexpected, is the evidence of such an obvious Western versus cultural dispute in developing countries. Although these countries do not have Western students attending the same schools as minority students, Western ideology unmistakably manifests itself in developing countries education systems. This concept of ‘racelessness’ stemming within an anti-white academic culture has also been examined in PNG, whereby Demerath (2000) found there were two classes of students. The ‘academically unsuccessful’ grounded their identities in a ‘village-based sense-of-self’. Everything from language use to style of dress, consumption of goods, and religion contributed to the production of an anti-academic student culture. These students’ identities were constructed within an idealised version of traditional PNG village life. Conversely, the ‘academically successful’ would often express aspirations and desires that were associated with ‘modern’ lifestyles otherwise known as ‘Western’ or ‘white’ lifestyles. Their social and academic orientations contrasted significantly with those of school failure, and these students were thereby labelled as acting “fancy”, “expensive”, or “extra”. High achieving students were found to have to endure ridicule for their aspirations of academic and vocational success, as well as attempts by other students to subvert their academic efforts. In an attempt to preserve their ‘white’ aspirations, students would then have to make adaptations to their study habits and the images they would portray. On occasion, students would give in to peer pressure and revert back to traditional village ways of thinking, which promote academic disengagement and underachievement.
It can be seen that although the ratio of Western to minority/Indigenous students differs between minority and developing settings, there is evidence of the same underlying cultural identification processes serving a role in student engagement and achievement. Just as students’ beliefs about the futility of education are greatly influenced by external socio-cultural factors, so too is the cultural identification process.

Another issue, especially pertinent to the cultural identification process, is the effect that colonization has had upon the educational experiences of students throughout the world. As mentioned earlier, minority students’ lack of personal and cultural identification with an imposed Western education system often prevents them from integrating and thus engaging in their schooling environment. The impact of colonial education in many developing nations has also been shown to have similar detrimental outcomes. Often, the colonization experience leaves the colonized race with a lack of identity and a limited sense of valuing their past (Ngugi, 1981). Colonial education results in the blurring between new, ‘Western’ ideas, and the formerly accepted indigenous practices.

In his research, Ogbu (1989;1992) also addresses the impacts of colonization upon indigenous peoples and he discriminates between two types of minorities – voluntary and involuntary minorities. The first type includes those who have moved to their host society predominantly by choice, for example, immigrant. Alternatively, involuntary minorities become members of their host society through slavery, conquest, or colonization. Although Ogbu’s work still predominantly examined minority groups, his research has broader implications for those societies that were also colonized, but continued to keep a majority indigenous population, such as PNG and many African societies. Ogbu
emphasised the unique situation of these ‘involuntary’ societies who have been colonised in that they often resent their current situation, the many social and political barriers they face, and the subsequent loss of freedom and culture. Ogbu (1989) goes on to suggest that voluntary immigrants can overcome these same barriers (e.g., social and political difficulties, loss of culture) due to the fact that they have a positive frame of reference which they use to interpret their problems as being temporary and ones that they can overcome. Alternatively, involuntary societies that have been colonized, interpret these obstacles without a positive frame-of-reference, such as a new homeland, and thus do not believe that their issues are neither temporary nor ones that can be overcome. Instead, for these groups, “discrimination is permanent and institutionalized, forcing them to look outside of schools and individual effort to collective effort for overcoming barriers to getting ahead” (Pena, 1997, p. 2).

This section has presented the influence of external factors on student learning processes. The following section introduces those internal factors that have been shown previously to greatly influence the educational experiences of students at school.

**Internal Factors**

Ogbu (1997) claimed that external, societal, and school factors alone cannot completely account for minority student underachievement. He believed that neither poverty, nor cultural identification, nor racism, nor the beliefs about the value of education, can independently account for the discrepancies between minority and mainstream achievement. Therefore, the final component of Fordham and Ogbu’s (1986) theory emphasised the importance of including
internal student factors as serving a vital role in student learning and achievement.

Some minority research has examined the internal, psychological characteristics of minority students and has outlined those that positively contribute to academic engagement and achievement. One body of educational psychology has identified individual attributes that contribute to academic ‘resiliency’ (Borman & Rachuba, 2001). Research has identified a range of individual characteristics that typify resilient children as having an internal locus of control, high self esteem, high self efficacy, autonomous beliefs, being actively engaged in school, possessing good interpersonal skills, and holding healthy expectations (Borman & Rachuba, 2001). A substantial amount of research on resilient children has focused on minority children from low socio-economic backgrounds and has found that resilient minority children, even in the midst of daily experiences of discriminatory behaviour and social, occupational, residential, and political inequity, still manage to achieve positive educational outcomes (Connell, Spencer, & Aber, 1994; Taylor, 1994).

Other models of student engagement and achievement that have been examined in minority settings have focused on other internal factors such as motivation, self-concept, and learning strategies as serving vital roles in predicting student outcomes (Marsh & Craven, 1997, 2006; McInerney, Roche, McInerney, & Marsh, 1997). Many of these psychological factors have been highlighted as facilitating students’ classroom experiences as well as in predicting educational outcomes such as effort and achievement. These internal models of student learning and achievement, however, have rarely been applied
to developing settings where they could potentially increase our understanding of the positive and negative internal influences of students’ educational experiences.

Section Summary

This section has outlined some areas of research that have been applied to and investigated within minority settings. Drawing from the theories of Fordham and Ogbu (1986), much of this research has focused on external factors or those student factors that are highly influenced by external factors such as socio-economic status and a student’s familial and environmental surroundings. When such an external framework is transferred to the developing world, these external influences are often extremely negative and debilitating, as outlined in Chapter 2. The following section introduces the focus for the current study and the developing world context in which the study is based.

The Current Investigation: The Development of a Model of the Psycho-Social Influences of Student Achievement in Developing Countries

The developing world often experiences the negative effects of many of these external influences to a greater extent than most other communities. Educational resources are scarce, school climates are often paralysed and stagnant due to funding crises and the lack of political and social support, and parental views about education are often somewhat lax and ambivalent, arguably because parental experiences of education did not result in increased life opportunities. Like minority students, children living in developing countries also experience the struggles of limited post-educational opportunities, which may contribute to disengagement and underachievement. Furthermore, some
research has shown that students in developing countries have also (like minority students) attempted to exemplify personal cultural identities in an attempt to avoid acting ‘white’, often leading to purposeful disengagement and underachievement.

Whilst these factors have been identified as predictors of student engagement and achievement at school, many of these factors are external and therefore, uncontrollable. When one comes to examine the socio-cultural status of students in a country such as PNG, the result might well be a feeling of being overwhelmed with the state of hopelessness and poverty that the people must face. Obviously there are no easy ways to intervene in issues that stem from low socio-economic status, family and environmental influences, political instability, and long-standing cultural belief systems. Change of that magnitude is required at a broader social and political level and is unlikely to occur in the short-term. Therefore, in order to make effective and sustainable interventions, the focus must be on influencing and changing internal, controllable factors, rather than the many important, but uncontrollable external factors. The current investigation therefore chose to focus on a selection of such internal factors that have in the past been shown to be somewhat ‘controllable’ or at least open to change and intervention. The primary aim of the study was to identify these internal student psychological factors that influence student educational outcomes beyond the influence of the external, uncontrollable factors.

The following sections outline the theoretical model upon which the current study’s research design is based and provides an overview of a selection of existing empirical literature supporting the importance of five major internal psychological variables. Finally, although somewhat external and uncontrollable,
a discussion of students’ parent, teacher, and socio-cultural influences will be presented and their role in the current investigation highlighted.

Models of Student Achievement

Overview

A large amount of research, from a variety of disciplines and schools of thought, has examined the psychological characteristics of students and how they relate to school achievement. Concepts such as self-regulation, motivation, self-concept, future goals, and school instrumentality have all been shown to influence student outcomes and have been studied extensively in Western cultures. These constructs have also been empirically tested in minority and other cross-cultural settings and cross-cultural comparisons have been investigated. However, these characteristics of the child have not been extensively examined in developing countries. Furthermore, rarely are these constructs examined in combination with each other. Although much is known about the influential nature of these psychological variables when examined individually, rarely have these constructs been integrated into a larger model to determine the differential effects of the variables. Only recently have researchers proposed a number of theoretical models that integrate such variables and examine their combined effects on student outcomes. The following section outlines one such model developed by McInerney (2007) that expanded upon the frameworks of Miller and Brickman (2004; Brickman & Miller, 2001). This model examines the combined influence of a number of psycho-social influences of education and will be utilised as the overarching framework of the current investigation.
McInerney’s Revised Model of Student Outcomes

A leading proponent in the field of student characteristics and their relation to student outcomes is McInerney, who has incorporated a number of psychological variables into a combined model of student achievement. Basing his model on research conducted by Miller and Brickman (2004) and Brickman and Miller (2001), McInerney (2007) proposed a revised model of cross-cultural academic achievement that incorporates the relations between students’ future-oriented and immediate achievement goals and their relation to student self-concept, self-regulatory learning processes, and performance. Although having its primary focus on student internal factors, the model emphasises the importance of examining the validity of such a model within the cultural, familial, social, and educational contexts of the student.

Figure 3.1 depicts the theoretical framework that is predicted to explain the relations between the characteristics of the student and their academic achievement. Five main psychological variables are included within the model – future goal orientation, perceived instrumental value of schooling, motivational goal orientation, self-concept, and self-regulation. As shown, students’ perceptions of their future goals are related to the perceived instrumentality of their schooling in helping them attain their goals. These two factors influence a student’s immediate motivational orientation, their academic self-concept, their use of self-regulatory strategies, and ultimately their performance at school. The model is a ‘full-forward’ model indicating that all psychological variables on the left hand side of the model influence the psychological and achievement factors on the right hand side.
In order to investigate the components of and empirical support for this model, it is necessary to consider the historical and theoretical underpinnings of each of the included variables in the model. The next section provides an historical overview of the main theoretical underpinnings of future goal orientation, perceived instrumentality, motivation, self-concept, and self-regulation, and their relation to academic outcomes.

Figure 3.1. McInerney’s Revised Model of Student Outcomes: Higher Order Representation of Hypothesised Full-Forward Structural Equation Model

*Note. SES = socioeconomic status variables; FG/IV = future goal orientation / perceived instrumental value variables; MOT = motivation variables; SR = self-regulation variables; SC = self-concept variables; OUT = achievement and effort outcome variables*

Initially, these categories will be discussed separately; however appropriate links will be made throughout the sections amongst the psychological variables and between the internal factors and student outcomes. Finally, a justification for the combined model of student achievement will be presented.
Motivational Goal Orientation

One prominent area in educational psychology is motivational research. Educators, researchers, and teachers from all cultures around the world have long considered adaptive motivation strategies to be fundamental to educational achievement (Watkins, McInerney, Akande, & Lee, 2003). In a review of major motivation theories and school achievement, Covington (2000) concluded that an interaction of social and academic goals, the motivating properties of these goals, and classroom reward structures influence students’ learning.

Motivation literature, however, has a long history. Many early motivational theorists explained motivated behaviour in terms of drives, instincts, motives, and other internal traits (Weiner, 1990). Other motivational theorists explained motivated behaviour as resulting from reward and punishment contingencies (Skinner, 1953). Most contemporary views of motivation, however, stem from a social-cognitive perspective. These theories include attribution theory, expectancy-value theory, and self-efficacy theories. Attribution theories explain achievement related motivation in terms of how individuals interpret and attribute their successes and failures in achievement situations (Weiner, 1979, 1985, 1986). Expectancy-value theories explain motivated behaviour in terms of how much an individual values a given task and how capable they believe they are of achieving in such a task (Atkinson, 1964; Wigfield & Eccles, 2000). Finally, self-efficacy theories are similar to expectancy-value theories in that they emphasise the individual’s judgements of capability in performing a task. Individuals who judge themselves as being capable of performing a task will be more motivated to engage in certain behaviours (Bandura, 1986).
Like attribution, expectancy-value, and self-efficacy theories, achievement goal theory is also a social-cognitive view of motivation, and a proliferation of research and theory on motivation has stemmed from achievement goal theory (Ames, 1992; Dweck, 1986; Dweck & Elliot, 1983). The next section provides an outline of achievement goal theory and its application to student learning and motivation.

**Achievement Goal Theory**

Achievement goal theory has emerged over the past twenty-five years as one of the most prominent theories of motivation (Meece, Anderman, & Anderman, 2006). The main thesis in achievement goal theory is that different achievement goals influence school achievement by way of varying the cognitive self-regulatory processes one uses for learning (Covington, 2000). The interest amongst achievement goal theorists is in integrating motivational constructs such as attributions, goals, and self-efficacy with cognitive constructs like declarative and procedural knowledge, learning styles, and meta-cognition (Pintrich & Garcia, 1991).

A further underlying premise of goal theory is that behaviour is purposeful, intentional, and directed towards the attainment of specific goals (Pintrich & Schunk, 2002). Achievement goal theorists emphasise academic related goals that are based on the development or demonstration of competence. Different individuals have different standards of excellence or criteria by which they judge their levels of competence. These criteria are significant in the development of motivational goal orientations.
**Mastery and Performance Goals**

Goal theory distinguishes between two types of motivation goal orientations: mastery and performance goals. Although the two categories of achievement goals have been given various titles: learning and performance (Dweck, 1986); task-involvement and ego-involvement (Anderman & Midgley, 1997; Nicholls, 1984); and mastery and performance goals (Ames, 1984; Ames & Ames, 1984; Ames & Archer, 1988), the conceptual relations among the titles are analogous. Students who adopt a mastery goal orientation focus on learning, understanding, and mastering a task, and tend to have an intrinsic motivation for learning (Pintrich, Marx, & Boyle, 1993). Such students believe that hard work and effort leads to success and base their achievement on self-referenced standards (Ames, 1992). Alternatively, students who adopt a performance goal orientation focus on their sense of self-worth and their ability to do better than others, surpass norms, and achieve public recognition (Ames, 1992). Hence, their learning is viewed only as a way to achieve a desired goal. In the overarching goal to achieve a sense of academic competence, a mastery oriented student derives satisfaction from the inherent qualities of the task, such as its interest, challenge, and enjoyment. Performance oriented students on the other hand derive their sense of accomplishment or competence by doing better than others and surpassing normative, performance standards.

**Goals and their Related Outcomes**

In explaining the relation between achievement goals and academic success, achievement goal theory posits a trichotomous framework, in which goals are related to cognitions and self-regulation, which in turn are related to
achievement (Covington, 2000). The relation between mastery goals, self-regulation, and achievement has been confirmed and replicated by research in a variety of contexts. Studies have supported the premise that students who adopt a mastery goal orientation are engaged to a greater degree in self-regulatory behaviours (Ames, 1992; Pintrich & DeGroot, 1990). These behaviours include: (a) monitoring one’s effort, understanding, and achievement; (b) organising one’s work via strategies such as paraphrasing and summarising; and (c) positively attributing success and failure to effort rather than ability (Covington, 2000). These self-regulatory behaviours have then been found to result in higher academic engagement and achievement, thus completing the positive relation between mastery goals, self-regulatory strategies, and academic achievement (Elliot, McGregor, & Gable, 1999). Students who adopt mastery orientations have also been shown to report high levels of task involvement, high levels of effort and persistence, and increased levels of learning strategies that enhance understanding and recall of information (Meece et al., 2006). Thus, mastery goals have been found to be positively related to self-regulation, self-concept, and achievement. These relations will be explored in further detail later.

The case for performance goals is more complex. Although a large amount of research has examined the relations between performance goals, learning strategies, and achievement, mixed results have been reported. Whilst some studies have found that performance goals result in surface learning strategies and low achievement (Elliot & Harackiewicz, 1996; Ng, 1998), others have found that performance goals are related to positive achievement (Dweck & Leggett, 1988), whilst others still have found no relations between performance goals and achievement (McInerney et al., 1997). Other research has found
performance goals to be associated with self-handicapping strategies (Urdan, Midgley, & Anderman, 1998), academic cheating behaviours (Anderman, Griesinger, & Westerfield, 1998), and low grades (Elliot & Church, 1997; Elliot & McGregor, 2001). According to Covington (2000) this discrepancy and contradiction is a result of earlier researchers not distinguishing between two types of performance orientations – performance approach and performance avoidance. Students whom endorse performance approach orientations, although still motivated by outperforming others and self-worth, approach success by investing a considerable amount of effort and implementing cognitive strategies to help them achieve their goal of surpassing norms (Wolters, Yu, & Pintrich, 1996). This is because a performance approach orientation is still focused on attaining success (Rawsthorne & Elliot, 1999). Thus, these students often end up displaying the same levels of engagement and achievement as mastery oriented students (Elliot et al., 1999). Alternatively, students who espouse performance avoidance orientations, seek to avoid failure via reduced patterns of effort, reduced task persistence, and the implementation of self-handicapping techniques to help students to “save-face” in the midst of failure (Pintrich, 1999). These mechanisms result in lower effort and the adoption of disadvantageous cognitive strategies which result in lower engagement and achievement (Covington, 2000). A multiple regression study by Elliot et al. (1999) confirmed the link between performance avoidance orientations, superficial processing and disorganisation, and low achievement. This same study also confirmed the link between performance approach orientations and superficial rehearsal, but increased effort and academic achievement. Furthermore, by experimentally inducing performance avoidance and approach orientations in two groups of
students, Roney, Higgins, and Shah (1995) confirmed the finding that performance ‘approachers’ were more persistent and successful than performance ‘avoiders’ in solving problems.

In addition to the performance approach – avoidance distinction, some researchers have also posited a mastery approach – avoidance distinction (Pintrich, 2000). Students who adopt mastery approach goals want to approach competence by learning and truly understanding the task at hand. Mastery avoidance orientations, however, are evident in students who want to avoid misunderstanding or not being able to grasp a particular task. However, research findings examining the distinction between approach and avoidance goals for mastery and performance orientations are not consistent across studies and across different groups. In particular, research evaluating the distinction between the two goal sub-types and the effects of avoidance goals on outcomes has resulted in mixed findings. Many researchers have therefore chosen to confine their research to mastery and performance approach goals only (Barker, 2006; Grant & Dweck, 2003; McInerney & Ali, 2006).

More recent research by Urdan and Mestas (2006) has suggested that whilst theoretically the approach – avoidance distinction makes sense, practically students are not clearly distinguishing between the two subtypes. In their qualitative investigation of performance oriented high school students, Urdan and Mestas found that the majority of students blurred the distinction between approach and avoidance components of their goal orientations when interpreting survey items. These students also had difficulties articulating and explaining the differences between approach and avoidance goals even when prompted to talk specifically about each sub-type. They found that students tended to always defer
to talking about their performance approach goals, that is, their desire to succeed, and not their avoidance goals, that is, their desire to avoid failure. This research is consistent with the questions raised by Roeser (2004) about the phenomenological reality of the approach – avoidance distinction. Roesner argued that students blend their approach and avoidance concerns and often think of them and articulate them as being the same construct. Simply put, “a concern with performing worse than others is indistinguishable from a desire to perform better than others” (Urdan & Mestas, 2006, p. 364). Furthermore, from a measurement perspective, many quantitative studies have also found difficulties with distinguishing between approach and avoidance goals (Middleton & Midgley, 1997). Scales, such as the Patterns of Adaptive Learning Survey, consistently report high correlations between the approach and avoidance scales. These results also bring into question the distinction between wanting to demonstrate superior ability and wanting to avoid demonstrating lack of ability and as such the approach-avoidance dichotomy is yet to be clearly demonstrated by research.

In addition to the lack of clarity and evidence supporting the distinction between approach and avoidance goals, traditional achievement goal theory has a number of additional limitations. These will be explored in the following section.

**Limitations of Achievement Goal Theory**

Traditional achievement goal theory has several limitations. First, the theory assumes that mastery and performance goal orientations are mutually exclusive. However, research has shown that this is not always the case and that students may hold both mastery and performance goals simultaneously.
depending on the nature of the task, school environment, and the broader social
and educational context of the institution (Blumenfeld, 1992; Meece, 1991;
Pintrich & Garcia, 1991). Current research emphasises the importance of
practitioners and educators acknowledging that students can, and most likely do,
simultaneously adopt multiple goals that have differential effects on learning
outcomes (Meece et al., 2006). Some research findings suggest that it is an
interaction of goals which results in the motivational determinants of action;
however it is still not clear what combination of goals (e.g., high mastery plus
high performance) is most advantageous across different groups, achievement
tasks, or learning contexts (Midgley, Kaplan, & Middleton, 2001).

Second, the two original goals (mastery and performance) put forth by
goal theory both have an implicit focus on individualism. The theory gives little
attention to goals and values that preserve group integrity, interdependence,
relationships and affiliation, and wanting to succeed for the sake of family,
friends, or other group members (Watkins, McInerney, Lee, Akande, & Regmi,
2002). These collectivist, rather than individualist values are often salient in non-
Western cultures, which bring into question the validity of the use of
achievement goal theory in cross-cultural research. For example, Blumenfeld
(1992) postulates that:

within the framework of goal theory, attempting to do well to
please an adult would be defined as performance oriented. Yet
the desire for adult approval is a powerful force in the
socialisation literature. In fact, seeking adult approval may be
an important precursor of adopting intrinsic motivation, in
effect, helping to sustain quality cognitive engagement (p. 276).

As research on students’ social relationships and social motives has expanded, it has become evident that students have other reasons for engaging in, or failing to engage in, academic work (Urdan & Maehr, 1995). Whilst mastery and performance goals are ultimately concerned with achieving competence, it is possible that students may adopt goals that are not directly concerned with achieving this competence. These goals are known as social goals and are discussed in the following section.

**The Case for Social Goals**

According to Covington (2000), the trichotomous framework of achievement goal theory today, openly invites the consideration and investigation of additional goals such as social goals. In 1992, Blumenfeld acknowledged that the role of social goals in determining achievement motivation and learning outcomes had typically been ignored by achievement goal theorists. Since then, a stronger attempt has been made by some theorists to include social goals in the framework of achievement goal theory.

Wentzel (1989, 1991) was one of the original researchers to emphasise the importance of examining socially directed achievement goals and their relation with student engagement and learning outcomes. Although not directly concerned with obtaining or demonstrating competence, student social goals were still found to have positive influences on student academic motivation and achievement. Wentzel’s research distinguished between two types of social
goals. Social responsibility goals were concerned with being dependable and getting tasks completed within a given timeframe, whilst social affiliation goals were concerned with having fun at school and making friends. Her research found that social responsibility goals were positively related to achievement whilst social affiliation goals were not related or negatively related with student outcomes.

In addition to research by Wentzel (1991) and Blumenfeld (1992), other research has examined a selection of different types of social goals. Miller et al. (1996) examined social goals that were concerned with pleasing one’s teacher and pleasing one’s family. They found that the teacher social goals were positively related to students’ use of self-regulatory learning strategies such as setting goals, monitoring progress, and making adjustments in study behaviour. The authors suggested that this type of goal could be used by students as a strategy in service of attaining other educational goals.

Maehr and colleagues also examined the quality and influence of what they termed social approval goals, and emphasised their distinction from mastery and performance goals (Maehr, 1984; Maehr & Nicholls, 1980). They suggested that an individual holding a social approval goal strives to demonstrate commitment and faithfulness to those they seek approval from. Therefore, when the ‘approver’ emphasises the importance of attaining competence, these approval goals will lead to high levels of effort and ultimately achievement. The authors did, however, acknowledge the potentially deleterious effects that approval goals can have on academic effort when students seek approval from sources that endorse negative views of high achievement (Urdan & Maehr, 1995).
Furthermore, Blumenfeld (1992) suggested that pro-social goals, such as gaining acceptance share a lot in common with academic goals and have been shown to help organise, direct, and empower individuals to achieve more successfully (Covington, 2000). Other goals that have been examined include social belongingness goals (Ford & Nichols, 1991), social solidarity goals (Maehr & Nicholls, 1980), and social concern goals (Dowson & McInerney, 2001, 2003; McInerney et al., 2001).

General consensus exists in the literature that the importance of social goals and the role that they serve in influencing other goals, learning strategies, and achievement outcomes, is still in need of further research. Further research is also needed in order to investigate the patterns of social goal adoption across developmental age, gender, and cultural groups. First and foremost, however, many researchers have concluded that there is a need to incorporate social goals into an achievement goal theory conceptualisation of motivation and achievement (Urdan & Maehr, 1995). Two such conceptualisations, Maehr’s Personal Investment Theory and McInerney’s Multidimensional Model of Motivation are discussed in the following sections.

**Personal Investment Model**

In addition to achievement goal theory discussed above, Maehr (1984, 2001) developed his Personal Investment (PI) Model, which conceptualised motivation as multidimensional. Maehr believed that motivation in education must be viewed in the broader context of a motivation theory that combines achievement with other social motives and cultural contexts. Stemming from a
social-cognitive framework, Maehr’s PI model incorporates the role of goal orientations as well as a ‘sense of self’ (Maehr, 2001).

There are three basic tenets to the PI model in explaining motivations underlying behaviour. Firstly, ‘beliefs about self’ refer to an “organised collection of perceptions, beliefs, and feelings related to who one is” (Maehr, 1984, p. 126). Recent research suggests that one’s sense of competence, that is, subjective judgements about one’s ability to perform effectively, is likely to guide preferences and choices that will impact the development of a talent or ability. The second component, ‘perceived goals of behaviour’, identifies four main achievement goals that influence the motivational focus of activity. These goals are task/mastery (minimal social comparison), ego/performance (socially competitive), social solidarity (faithfulness; pleasing significant others; demonstrating good intentions), and extrinsic rewards (earning money, a prize or another object). Furthermore, Maehr’s (2001) framework suggests that goals need to be perceived as ‘interpretive frames’ or ‘schemas’ which either focus one’s attention on the ‘self’ (e.g., performance goals) or on the ‘activity’ (e.g., mastery goals). These goal orientations then interact with one another to influence an individual’s behaviour. The third component of the model is ‘action possibilities’, referring to an individual’s perceived alternatives or behaviours for pursuing goals. These possibilities will be appropriate for an individual in terms of their socio-cultural norms and other external factors such as their family structure and values, geographic location, and socio-economic status. All of these factors are hypothesised by Maehr to influence an individual’s choice and behaviour.
By incorporating an individual’s sense of self and their perception of action possibilities with their goal orientations, PI theory allows for a far richer investigation of student motivation and achievement, particularly in the cross-cultural domain (Maehr & McInerney, 2004). PI theory also proposes three culturally sensitive factors within its framework, which are predictors of students’ sense of self, goal orientations, and perception of action possibilities. The structure of tasks and situations, an individual’s personal experience and access to information, and the socio-cultural context, can all differentially influence the three components. Thus, this model, in the educational domain, takes into account the influences and characteristics of the educational structure (i.e., the school), the individual student’s experience (i.e., the child), and the cultural surroundings (i.e., the family and community).

Maehr’s PI model has been validated by research in both Western and cross-cultural settings (McInerney, McInerney, & Roche, 1994). A number of instruments, such as the Inventory of School Motivation (McInerney, 1990, 1991, 2000; McInerney & Sinclair, 1991), the Facilitating Conditions Questionnaire (McInerney, 1990, 1991, 2000), and the Self-Description Questionnaire (Marsh, 1988, 1992), have been constructed in an attempt to measure students’ ranges of goal orientations, self values (e.g., self-reliance, self-esteem, self-purpose, and self-concept), and facilitating conditions for action across a range of cultures. One of the most interesting points to come out of this vast amount of cross-cultural research is that diverse groups actually endorse a similar range of educational goals and values as each other, and that the key predictors of achievement and attendance are generally consistent across cultures (Maehr & McInerney, 2004).
Stemming from Maehr’s (2001) description of motivation, the following section describes the way in which student motivation and achievement has been conceptualised as a multidimensional, hierarchical construct. It also outlines the body of cross-cultural research that has been conducted within this framework, and highlights research findings that suggest that universal predictors of achievement exist.

McInerney, Yeung, and McInerney’s (2001) Multidimensional Model of Motivation

Mastery, performance, and social goal orientations. As discussed earlier, recent research has moved away from the mastery – performance dichotomy, and has conceptualised motivation as a multidimensional, hierarchical construct whereby a student can simultaneously hold multiple goals. In their review of the literature examining mastery and performance goals, Marsh, Craven, Hinkley, and Debus (2003) emphasised the need to investigate both the first-order factors and the higher-order factors that explain them. They posited eight first-order motivational orientation factors that are explained by the higher-order factors of learning and performance orientation. By applying structural equation modelling, they found that: mastery, intrinsic, and cooperative orientations were explained by a higher-order ‘learning’ orientation; ego, competition, and approach to success and avoid failure orientations were explained by a higher-order ‘performance’ orientation; and that an ‘individual’ orientation was explained by both higher-order factors. They emphasised that although the higher-order factor model offers gains in theoretical and empirical
parsimony, it is vital that researchers examine the first-order factors so as not to lose vital, specific detail.

Stemming from Maehr’s PI model and consistent with advice from Marsh et al. (2003) to examine constructs at the first-order factor level, McInerney et al. (2001) proposed a hierarchical, multidimensional model of motivation goal orientations that incorporated a wider range of goals assumed to be relevant in both Western and non-Western cultures. This model outlines the relation between eight specific first-order goals: task, effort, praise, competition, social power, token, social concern, and affiliation at the base of the hierarchy; which can be grouped into three higher-order factors: mastery, performance, and social (see Figure 3.2). This model structure has been supported across a number of different educational and cross-cultural settings (McInerney & Ali, 2006).

![Figure 3.2. McInerney, Yeung, and McInerney’s (2001) Multidimensional and Hierarchical Conceptualisation of Motivation](image)

Note. Task=Task Goals, Effort=Effort Goals, Comp=Competition Goals, Power=Social Power Goals, Praise=Praise Goals, Token=Token Goals, Affil=Affiliation Goals, Conc=Social Concern Goals

**Relations between Goals and Outcomes**

Relations between students’ motivational orientations, use of learning strategies, and academic outcomes have also been investigated using McInerney
et al.’s (2001) multidimensional framework. Studies using this framework have found strong relations between mastery goal orientations, deep learning processes, and high academic achievement. Some studies have found a similar relation for social goal orientation; however, paradoxical results are also apparent in the literature (Wentzel, 1996). Some researchers have suggested that an interaction between social and mastery goals positively effects achievement (Covington, 2000); however, the mechanisms underlying this interaction are not yet clear.

Cross-culturally, the hierarchical model of motivation has been supported by confirmatory factor analysis for both Western and non-Western respondents (McInerney et al., 2001; McInerney & Ali, 2006). The model has also been used in a number of studies examining the relation between motivational factors and academic achievement in different cultures, including Indigenous minority groups in Australia and America (Ali, 2006; McInerney et al., 1997; McInerney & Ali, 2006; McInerney & Sinclair, 1991). Interestingly, McInerney has consistently found more similarities than differences in student motivational profiles across a wide range of cultural settings (McInerney et al., 1997).

In other cultural settings, Watkins et al. (2003) found that deep (mastery) motivation goal orientations (such as ‘working hard’ and ‘interest’) were good predictors of deep learning strategies amongst both European and South-African students. McInerney et al. (1997) found that a positive relation between learning goals and high achievement existed amongst students from three different ethnic cultures – Anglo, Aboriginal (Australian), and Native American (Navajo).

In a study of seven different cultural groups, Ali (2006) examined the relations between eight first-order motivational goal orientations and student
outcomes. He found that effort mastery goals were positively related to learning outcomes, but an inconsistent cultural finding appeared for task mastery goals. For performance goals, a positive relation was found between competition goals and student outcomes, but a negative relation was found for praise and token goals. Finally, for the social goals, a positive relation was found between social concern goals and outcomes, but a negative relation was found for social affiliation goals.

Universal (Etic) vs. Culturally Specific (Emic) Evidence

One of the findings that became apparent when examining the relation between achievement and PI theory’s sense of self, goal orientation, and facilitating condition factors is that clear factors emerge as important predictors of academic achievement across a wide variety of cross-cultural groups (Maehr & McInerney, 2004). McInerney has consistently found a number of similarities in motivational profiles across groups of students from Anglo, European, Asian, Aboriginal, Middle Eastern, African, and Native American cultures (McInerney, 2003).

As well as finding commonalities across cultures, research has also found some significant differences between diverse cultures. First, the relative importance of some motivational predictors varies within and between cross-cultural groups. For example, McInerney (2003) found that ‘social concern’ varied in salience across Australian, European, Aboriginal, Asian, Navajo, and Middle Eastern groups. Second, some motivational constructs predict academic achievement in some countries, but not others. For example, McInerney found that ‘social power’ was a strong predictor of further education, affect, and the
valuing of education for Asian students but not for Aboriginal Australian students. Furthermore, McInerney found that ‘token’ oriented motivations were a strong negative predictor of further education for Australian, Aboriginal, and Asian groups, but not for Navajo and Middle Eastern groups. Thus, there is evidence for both universal, etic, conceptualisations of motivation and the role goal orientations serve in student learning, as well as support for culturally specific, emic, understandings of these processes.

Section Summary

Motivational research, guided by achievement goal theory and personal investment theory, has examined the salience of motivational constructs and the relations between them and academic outcomes, across a large variety of cross-cultural settings. Mastery, performance, and social goal orientations, along with their first-order sub-type goals, have been shown to be influential predictors of other psychological influences, such as learning strategies, and student learning outcomes. However, one of the important implications of this motivational research has been the realisation of the need to incorporate a broader range of psychological influences into a model of student achievement. In order to gain this more complete understanding of student engagement and achievement, a broader educational and psychological approach needs to be employed. Therefore, McInerney and colleagues (Brickman & Miller, 2001; Miller & Brickman, 2004) have developed and incorporated theoretical perspectives on self-regulation, self-concept, and future goal orientation into a broader and more comprehensive model of student achievement. The following sections outline the theoretical and empirical underpinnings of two additional important
psychological influences of student achievement – future goal orientation and the perceived instrumentality of schooling.

**Future Goal Orientation and Perceived Instrumental Value**

Research in the field of educational psychology has often focused its attention on short-term, proximal motivational goals and strategies. In doing so, this research has excluded the importance of personally valued future goals and their perceived schooling instrumentality, in increasing our understanding of student motivation and achievement. In more recent times, researchers have attempted to incorporate other psychological variables, including future goals and instrumentality, into their conceptualisations of student engagement and achievement at school. The following sections outline those theories underlying student future goal orientation and the perceived utility value or instrumental value of schooling in helping them to achieve these future goals. The relations between these variables and other motivational and achievement variables are also explored.

**Future Goal Orientation**

Although research has indicated that clear and specific immediate goals are related to achievement and effort, some researchers have attempted to investigate the role that future goals play in human motivation and other behavioural outcomes. Also known as future time perspective, a future goal orientation is the degree to which, and the way in which, the future is integrated into the present life through motivational goal setting processes (Husman & Lens, 1999). Two of the first modern psychologists to mention the imagined
future as playing a role in human motivation and behaviour were Frank (1939) and Lewin (1935). They suggested that a future goal orientation develops as a child increases in age and that “the goals that determine a child’s current behaviour are thrown continually further into the future” (Lewin, 1935, p. 173). They suggest that individuals not only have a grasp over what they desire in present situations, but that they look towards and develop hopes and expectations for the future.

Future goals have since been studied in a number of different educational settings and have also been referred to as life tasks (Cantor & Kihlstrom, 1987), personal strivings (Emmons, 1989), personal projects (Little, 1987), possible selves (Markus & Nurius, 1986), future consequences (Miller et al., 1996), and behavioural projects (Nuttin & Lens, 1985). According to Phalet, Andriessen, and Lens (2004) schooling is a future-oriented investment across all cultures. Despite mixed evidence from cross-cultural studies on the motivational role of the ‘future’ in sustaining school engagement and achievement, recent developments in motivational research, future time perspective, and goal theory have developed a more “fine-grained motivational theory of future goals” (Phalet et al., p. 61).

Nurmi, Poole, and Kalakoski (1994) expressed their belief that people view their personal future in terms of goals, hopes, expectations, and concerns. Individuals set these future-oriented goals by “comparing their individual motives to their knowledge and personal perceptions of future possibilities” (Nurmi et al., 1994, p. 472). Stemming from work by Nuttin and Lens (1985), Phalet et al. (2004) posit that the formation of motivational goals in the distant future creates a ‘future time perspective’ (FTP) in an individual, which in turn
strengthens their motivation to strive for such future goals. This FTP can be defined as the present anticipation of future goals (Husman & Lens, 1999). Human beings can be said to have either short or long FTPs. Those who have a short FTP formulate their goals in terms of the near, realistic future. They do not plan too far into the future and are not motivated by goals that seem to be very distant in their awareness of time. Those who have a long FTP on the other hand set both long-term and short-term goals. They are easily motivated by potential events or action outcomes that are in the distant future.

Other researchers have conceptualised future goals as being a fourth dimension of achievement goal orientation. For example, Miller et al. (1996) posited future goals or future consequences as being a fourth category of motivational goals alongside mastery, performance, and social goals. They described future consequences as being “anticipated and valued distant consequences thought to be at least partially contingent on task performance but not inherent in the performance itself” (Miller et al., p. 390). Examples of such future goals included: financial rewards, maintaining eligibility for extracurricular activities, gaining entry to college or university, and reaching career objectives. Two important aspects of future goals have been identified as being pertinent to the adoption of future goals and will be discussed in the following section.

**Value and Feasibility of Future Goals**

Researchers have suggested that student uptake and endorsement of future goal orientations are dependent on two important factors – the value that they place on the future goals themselves and the anticipated feasibility of them
attaining the future goal. DeVolder and Lens (1982) found that students who reported high achievement and effort levels in their schooling reported valuing their future goals more highly than students who reported low achievement and effort levels. Furthermore, research by Schutz (1993) and Schutz and Lanehart (1992) found that the adoption of valued long-term education-related future goals was positively related to achievement and self-regulatory strategy use. Similarly, Miller et al. (1996) found positive relations between valued future goals and student achievement and self-regulatory outcomes. They suggested, however, that attempts are made by educators and future researchers to emphasise the coordination of immediate proximal goals with distant valued outcomes.

Research by Maehr and colleagues (1984; Maehr & Braskamp, 1986) suggests that it is only when individuals value their perceived future goals that they will decide to increase their level of investment in immediate actions seen as being linked to their future goals. Thus, the initial commitment to a valued future goal may be a catalyst in the process of the development of proximal goals and other learning strategies.

The value an individual places on a future goal, however, is not sufficient for determining their commitment to the goal or their development of immediate actions directed towards attaining that goal. As suggested by Bandura (1986), an individual’s knowledge of possibilities surrounding the feasibility of goal attainment also plays an important role in one’s future goal orientation. This feasibility refers to the likelihood that an individual feels that they will actually attain a specific future goal. Goal feasibility is generated through a number of processes and is based on different factors. These factors often include one’s general feelings of self-efficacy, self-esteem, or self-worth surrounding a
particular goal (Miller & Brickman, 2004), or their development of particular self-schemas (Cantor, 1990). Other factors might include an individual’s perceived obstacles to goal attainment, such as systematic bias or peer interference (Bandura, 1986). On a broader level, an individual’s perception of the feasibility of their future goals will be influenced by social and contextual factors such as the home, peers, school, media, and environment which have all been shown to shape both an individual’s value of future goals and their perceived feasibility of attaining those goals.

Questions surrounding future goal value and feasibility are particularly relevant in the context of cross-cultural research in developing and under resourced communities. Some research has also examined the value and feasibility of future goals for students living in such areas, however, our understanding of the processes underlying student effort and achievement would be enhanced by exploring these predictors of future goals in more depth. An understanding of students’ personally valued future goals in the context of low socio-economic surroundings will provide invaluable insight into the role that a future goal orientation, in conjunction with perceived schooling instrumentality, serves in influencing student outcomes. This perceived instrumentality will be explored in the following section.

Perceived Instrumentality

Perceived instrumentality refers to the value an individual places on a current behaviour in assisting them to attain some future consequence. Within the schooling context, perceived instrumentality refers to the value students place on
their current classroom and schooling behaviours in helping them to reach the goals they have set for their futures.

There is an interplay between perceived instrumentality, future goal orientation, and the value and feasibility an individual places on their future goals. For example, Vroom (1964) hypothesised an interaction between future goals, their value, and perceived instrumentality. Specifically he suggested that the value placed on attaining an immediate (proximal) goal is a function of both the perceived instrumentality of the proximal goal to achieving future goals, multiplied by the value an individual places on the future goals. For example, the likelihood of a student engaging in a classroom behaviour that would increase his chance of receiving a distinction on a science exam (proximal goal) would be dependent on his perceived instrumentality that getting a distinction would increase his chances of becoming a doctor (perceived instrumentality), and the value he places on his goal to become a doctor (future goal). When a proximal task is perceived to be instrumental to the attainment of a future goal, engagement in the proximal task is increased by two incentives – the consequences that follow the accomplishment of the proximal goal and the consequences that are anticipated to follow the attainment of the future goal (Miller, DeBacker, & Greene, 1999).

FTP theorists (Lens, 1986; Nuttin & Lens, 1985) have also proposed an interaction between future goal orientation and perceived instrumentality. As outlined earlier, research has documented the positive effects of holding future goals on student outcomes. Whilst it seems plausible to predict that the establishment of future goals leads to increased motivation which leads to
increased engagement and achievement, research has found that the relation between these constructs is more complex.

De Volder and Lens (1982) distinguished between two components of FTP, cognitive and dynamic, and suggested that they play differential roles. The cognitive aspect refers to the perceived instrumentality and value of current task goals in reaching future goals. Cognitive FTP refers to one’s ability to anticipate both the present value and long term consequences of one’s behaviour. The greater an individual’s cognitive FTP the more value they place on immediate learning and achievement school tasks as a means for reaching their future goals (Phalet et al., 2004). Alternatively, the dynamic aspect of FTP refers to the value an individual places on the goals in the future themselves. Students with a large dynamic FTP place greater value on their future goals, even when they are located some distance away in their temporal future.

According to expectancy x value theory, a solid link can now be drawn between an individual’s future goals and their achievement. That is, when individuals (a) have high expectations that their immediate behaviour will produce desired outcomes (cognitive FTP) and (b) place a high subjective value on their desired future goals (dynamic FTP), expectancy x value theory says that this will result in higher motivation levels (Feather & Newton, 1982).

A large body of research has been conducted in both Western and cross-cultural student settings and has supported the link between future goal orientation, classroom orientation, and achievement although the mechanisms behind this interaction are still empirically unclear (Phalet et al., 2004). De Volder and Lens (1982) found that more motivated students attached more valence to their future goals than less motivated students did. Furthermore,
motivated students attached more value to their present tasks and activities as a means for reaching their valued future goals, than did less motivated students.

Expanding upon research examining the relations between future goal orientation, instrumental value, and motivational goal orientation, Phalet et al. (2004) proposed an interaction effect. Based on work by Van Calster, Lens, and Nuttin (1991), Phalet et al. suggested that perceived instrumental value only increases one’s motivation when students have a positive attitude towards their personal future. That is, only when students place a high and positive value on goals in their future (and believe that their future goals are feasible) will valuing their present tasks and goals have a positive effect for their motivation to strive for these goals. Conversely, for students who have a negative outlook on their future, attaching high perceived instrumental value to their present schooling has been found to actually decrease their level of motivation.

**Future Goals, Perceived Instrumentality, and Achievement Goals**

Future goal orientation and perceived instrumentality are inherently linked with the setting and achievement of immediate achievement motivational goals. Supporting the relations between future goals, instrumentality, and achievement goals, Miller and Brickman (2004) suggested the following two functions of future goals. Firstly, future goals provide the impetus for the formation of students’ immediate achievement goals. These goals are immediate reasons for engaging in school tasks and include mastery, performance, and social goals, outlined in the previous sections. Secondly, future goals represent incentives for engaging in present action (and hence increasing student effort and achievement outcomes), but as discussed, only when current tasks are perceived as being
instrumental to the attainment of valued future goals. Therefore, the commitment to a valued future goal and the perceived instrumentality of schooling in helping one attain this valued goal, become catalysts for the process of developing proximal, achievement goals. Once a framework of future goals has been committed to, an individual is in a position to generate complimentary, proximal achievement goals to guide their action towards achieving future goals (Bandura, 1986). These goals may include becoming the best in class, developing a solid understanding of a subject, or showing concern for a friend who is struggling with their work.

**Section Summary**

As outlined in the previous sections, future goal orientation and perceived instrumentality have been shown to predict motivational goal orientations and therefore contribute to a student’s level of academic engagement and achievement. In addition to the positive relations between future goals, instrumentality, and motivational orientations these variables have also been found to be related to a student’s belief about their ability and performance on immediate tasks. The next section will explore the self-concept construct and how this relates to other psychological variables and student outcomes.

**Self-Concept**

Consistent with the theory and research outlined in the previous sections, Bandura’s (1986) social-cognitive theory purports that human actions are goal directed and performed in order to obtain anticipated and valued outcomes. In addition to his thoughts on goals, consequences, and instrumentality, Bandura
also proposed self-efficacy beliefs as playing important roles in generating the behaviours needed to obtain valued outcomes. According to Bandura, relations exist between the goals that an individual sets for themselves, the value that they place on attaining those goals, and the belief that they are capable of generating behaviours to attain those goals. He argued that these beliefs influence an individual’s willingness to attempt a task, level of effort expended, and their persistence in the face of challenge.

Research supports claims attesting to the importance of self-beliefs in particular in relation to self-concept. Also termed ‘ability perceptions’ (Eccles, Wigfield, Harold, & Blumenfeld, 1993), self-concept has been shown to serve an important role in both directly influencing student outcomes and interacting with other psychological variables. The following section presents a discussion of these beliefs within the context of different frameworks of self-concept.

**Unidimensional Framework of Self-Concept**

Self-concept has a long and controversial history. A vast amount of research has examined self-concept or other ‘self’ related phenomena and its relation with motivation, engagement, and achievement. In their classic review, Shavelson, Hubner, and Stanton (1976) reported that most previous self-concept research had been of a substantive nature, and that insufficient attention had been given to methodological issues pertaining to the measurement of the construct (Byrne & Worth-Gavin, 1996). Between-construct studies, whereby self-concept was related to other constructs, were undertaken prior to ascertaining within-construct issues regarding defining the structural nature of the self-concept construct. Prior to 1976, self-concept had been generally examined within a
unidimensional framework. Influenced by Spearman’s (1927) two-factor theory of intelligence, the appraisal of a unidimensional, global intelligence construct was also attributed to self-esteem, as representing a global, overarching component of self-concept. Therefore, historically self-concept was conceptualised as a unidimensional construct whereby any different facets of self-concept were thought to be so heavily dominated by a general factor that they could not be adequately differentiated (Marsh & Craven, 2006). However, early self-concept research was characterised by paradoxical findings and a-theoretical approaches. These ambiguities prompted Shavelson et al. (1976) to address within-construct issues and redefine the conceptualisation of self-concept so that it was examined within a multidimensional framework. This framework will be discussed in the following section.

**Multidimensional Models of Self-Concept**

Shavelson et al. (1976) proposed a new conceptualisation of self-concept whereby different domain specific self-concept constructs were differentiated. Their model proposed that self-concept was both multidimensional and hierarchically ordered. In this model they suggested that a general perception of self (global self-concept) was positioned at the apex of the model and that moving down the model resulted in self-concept domains becoming more and more differentiated. First, self-concept was divided into two facets – academic and non-academic self-concept. Second, the non-academic self-concept construct was divided into three categories – social, emotional, and physical self-concept. Finally, nine domain-specific types of self-concept were proposed as first-order facets of self-concept. Examples of these included mathematics, physical ability,
and peer self-concept and below this level self-concept became even more differentiated. This model, however, was not tested until the advent of multidimensional self-concept measurement instruments, such as the Self-Description Questionnaire (Marsh, 1988).

Since Shavelson’s model was proposed, research has found support for the multidimensional nature of self-concept, however, support for the hierarchy is weak (Marsh & Shavelson, 1985; Vispoel, 1995). Development of the Internal/External (I/E) frame-of-reference model by Marsh (1986) found support for the multi-dimensional conceptualisation of self-concept and provided the basis of a revision by Marsh and Shavelson (1985) away from a uni-dimensional self-concept framework. This I/E model will be returned to when academic self-concept is discussed.

Based on research with the SDQ instruments, a revised model of self-concept was developed by Marsh and Shavelson (1985) in which focus was placed upon the multidimensional nature of self-concept. These models have provided a blueprint for self-concept research, such that it is now recognised that self-concept cannot be adequately understood unless its multidimensionality is accounted for (Marsh & Craven, 2006). As such over the past two decades of self-concept research, a shift has been made by many researchers away from the traditional unidimensional conceptualisations of self-concept to a multidimensional one (Marsh, 1993; Marsh & Craven, 1997, 2006). This research has examined the domain specific facets of self-concept as differentiated components. Three of these domain specific components of self-concept are mathematics, English, and general academic self-concept which are relevant to
the purposes of the current investigation. These three self-concept domains will be discussed in the following section.

**Academic Self-Concept**

Support for the multidimensional perspective of self-concept has been particularly strong within the academic domain (Marsh, 1993). In a review of research examining the relations between self-concept and achievement, Byrne (1984) found that whilst most studies reported a number of positive relations between the self-concept factors and achievement, these relations were strongest for the academic self-concept factors. Marsh and Craven (2006) confirmed these findings that academic achievement is more positively and more strongly related with the academic components of self-concept than with the non-academic components. Furthermore, they confirmed the finding that verbal (English) and math achievement is correlated more highly with their corresponding domain specific self-concept counterparts (i.e., English and math self-concept) than with the other domains of self-concept.

In addition to this, Marsh (1986, 1990, 1993) developed his Internal/External (I/E) frame-of-reference model to explain the distinction between the academic domain facets of self-concept. Interestingly, it was the development of this model that led to the revised conceptualisation of self-concept as multidimensional. Although high correlations between student math and English achievement levels are often found, this is not the case for correlations between math and English self-concept reports. Marsh suggested that this was due to the I/E framework that students operate within:
Whereas individuals with good mathematics skills also tend to have good verbal skills and vice versa (math achievement and verbal achievement are substantially correlated), people think of themselves as either “math” persons or “verbal” persons (math and verbal self-concepts are nearly uncorrelated). According to the I/E model, verbal and math self-concepts are formed in relation to both external and internal comparisons, or frames of reference. (Marsh, Martin, & Hau, 2006, p. 139).

These external comparisons occur when people compare their perception of their own ability with their perception of the ability of other people within their frame of reference. Internal comparisons occur when an individual compares their perceived ability in one domain specific subject with their perceived ability in another subject (Marsh, 1986).

This I/E framework has been consistently found across a number of educational and cross-cultural settings. In a study of twenty-six countries, Marsh and Hau (2004) found persuasive and consistent evidence for the I/E model of self-concept. Thus, self-concept plays an important role in the prediction of student outcomes across a vast array of educational and cross-cultural settings. These relations between self-concept and student outcomes, and the relations between self-concept and other psychological variables, will be explored in the next section.

The Role of Self-Concept

Self-concept has been shown to both influence and be influenced by a number of different variables. In McInerney’s revised model of student
achievement (see Figure 3.1) it is proposed that self-concept plays a mediating role between students’ future goals and instrumentality and their achievement goals, and students’ self-regulatory strategies and effort and achievement outcomes.

Past research has substantially investigated the relations between self-concept, academic engagement, and achievement. As outlined in the previous section, self-concept has been shown to influence achievement within a domain-specific, I/E framework. Math self-concept has been consistently related to math achievement and English self-concept has also been found to positively predict English achievement (Marsh & Craven, 2006). In addition to these relations, studies have been conducted that have explored the reciprocal effect relations between self-concept and domain specific achievement. In a pioneering study, Marsh (1990) tested the causal ordering between academic self-concept and academic achievement. The study found strong support for the effect of prior self-concept on subsequent school grades. However, Marsh did not find strong support for the reverse relation of prior school achievement predicting current academic self-concept. Therefore, Marsh concluded that self-concept is causally predominant over school achievement.

In their summary of the literature, however, Marsh and Craven (2006) found support for a reciprocal effects model of self-concept. They noted that the causal relation between academic self-concept and achievement is conceived as dynamic and reciprocal and their review of the literature found extensive support for both the multidimensional conceptualisation of self-concept and for the reciprocal effects model between academic self-concept and academic
achievement. They emphasised the important causal role that self-concept plays in influencing both variables including achievement–related outcomes:

This critically important [REM] research has established that self-concept is indeed a ‘hot’ variable that makes good things happen: Increases in specific domains of self-concept lead to increases in associated achievement-performance domains and other desirable outcomes (p. 158).

In addition to studies which were predominantly conducted in English-speaking, Western, mainstream schools, some research has found cross-cultural support for the causal and reciprocal effects of self-concept on achievement. Support for the reciprocal, domain specific effects of self-concept on academic achievement has been found across a number of different cultural settings, including research conducted in Hong Kong (Marsh, Hau, & Kong, 2002) and in East and West Germany (Marsh & Koller, 2003).

Recent studies, however, have begun to examine the influence of self-concept on achievement in conjunction with other important psychological influences of academic outcomes. Barker (2006) tested a reciprocal effects model examining the influence of both motivational goal orientations and self-concept on student academic achievement. Her findings emphasised the importance of simultaneously examining both goal orientations and domain specific self-concept within the same model in order to achieve a ‘more complete’ understanding of student achievement. According to Barker:

If one construct is examined to the exclusion of the other, then a holistic account of how these two fundamental constructs [self-concept and goals] causally combine to affect achievement, will
be absent and an insufficient explanation of academic achievement will be provided (p. 251).

Consistent with Barker’s (2006) view, research has been undertaken that examined the combined influence of self-concept and other psychological variables on student outcomes. Miller et al. (1996) examined the combined influences of current achievement goals (mastery and social), future consequences, and self-concept on student outcomes. Their model also emphasised the importance of examining these constructs within the same model to gain a greater understanding of the combined influences of student outcomes.

To summarise, research has supported: (a) the importance of conceptualising self-concept within a multidimensional framework; (b) the causal role that academic self-concept plays in predicting domain specific academic achievement; (c) the cross-cultural nature of the role self-concept serves in predicting outcomes; and (d) the need to examine self-concept in conjunction with other significant psychological influences of achievement. The next section discusses the final psychological variable included in McInerney’s (2007) revised model of student achievement.

**Self-Regulation**

According to McInerney’s (2007) revised model, self-regulatory learning strategies are the final mediating variable between students’ future goals and instrumentality, immediate achievement goals, self-concept, and student outcomes. Such learning strategies have been widely studied and considered to be influential factors in determining a student’s academic engagement and achievement level.
Learning has been defined as the “complex process of assimilating, structuring, and applying new knowledge and skills” (Phalet et al., 2004, p. 76). In particular, self-regulated learners are capable of choosing appropriate learning goals, are able to use available and appropriate knowledge and skills to direct their learning, and can select learning strategies relevant for targeted tasks (Marsh, Hau, Artelt, & Baumert, 2006). According to Bandura’s (1986) social-cognitive theory, self-regulation involves three main processes: self-observation or behavioural monitoring; self-evaluation of progress or self-judgement; and self-reaction including both affective and tangible self-initiated consequences. Components of these strategies will be discussed in the following section.

**Learning Strategies**

Similar to Bandura’s three-fold conceptualisation of self-regulation, is the common distinction made by self-regulation theorists between two main types of learning strategies. Researchers have proposed that the two major components of self-regulated learning are cognitive and metacognitive information processing strategies (Boekaerts, 1997; Marsh et al., 2006). Cognitive learning strategies are the cognitive strategies or ways of processing information students employ when studying (Pintrich, 1989). These cognitive strategies include techniques such as cognitive rehearsal, elaboration, organisation, and critical thinking. In addition to these, students employ self-regulatory and resource management strategies for learning such as time management and effort regulation.

In 1987, Biggs proposed a vital distinction between what he coined ‘deep’ and ‘surface’ cognitive learning strategies. Biggs (1987) proposed that
students who adopt surface level learning strategies are motivated by pass-only aspirations and hence develop minimum effort learning strategies, often dictated by rote learning only what is necessary (Biggs, 1987; Tickle, 2001).

Alternatively, students who adopt deep learning strategies, such as obtaining a broad sophisticated understanding, reading widely, and relating new material into an existing context, are hypothesised to be motivated by deep, mastery focused goals. The latter include the desire to work out the meaning of, to master and understand their work (Tickle, 2001), and to achieve a sense of accomplishment from the inherent qualities of the task, such as its challenge, interest, or enjoyment (Biggs, 1987; Blumenfeld, 1992; Meece, Blumenfeld, & Hoyle, 1988).

In addition to the distinction between deep and surface level learning strategies, Biggs (1987) and Entwistle and Ramsden (1983) also attended to a third approach to learning, known as ‘achieving’. According to Watkins (2000), students who adopt achieving strategies, attempt to achieve the highest possible grades by employing strategies such as working efficiently, applying effort, and being cue conscious. These students would use a combination of deep and surface learning strategies to ensure they reached academic success.

Since Bigg’s (1987) distinction between deep and surface learning strategies, some researchers have criticised his two-fold distinction as being a too narrow interpretation of the vast amount of strategies for learning available for self-regulated learners. In their review of the literature on self-regulation, Marsh et al. (2006) highlighted three main cognitive strategies (elaboration, transformation, and rehearsal strategies) and three main metacognitive strategies (planning, monitoring, and regulating strategies) available for learners.
Furthermore, paradoxical findings are often reported concerning the relations between deep, achieving, and surface learning strategies and academic outcomes. In his research with Chinese school students, Watkins (2000) has found consistently that rote learning and memorisation strategies, originally conceptualised as surface strategies and hence negatively related to student outcomes, were in fact positively related to Chinese students’ achievement. Thus, debate exists pertaining to a dichotomous conceptualisation of deep and surface learning strategies as being strictly positive and negative for learning outcomes.

A broader conceptualisation of self-regulated learning strategies will be discussed in the following sections and a distinction will be drawn between a broad number of strategies.

**Cognitive Strategies**

Cognitive strategies are generally defined as learning strategies which are the means by which students select, acquire, and integrate new knowledge with existing knowledge (Montague, Applegate, & Marquard, 1993). The cognitive learning strategies purported in Marsh et al.’s (2006) summary included memorisation strategies (e.g., reading material aloud and repeating vital facts and terms), elaboration strategies (e.g., construction and integration of ideas), and transformation or organisation strategies (e.g., transferring information from one form to another).

Rehearsal strategies have been shown to be useful for some classroom activities, however many tasks require a deeper understanding of content, beyond what the simple recall of information provides. Thus, an over-reliance on
rehearsal strategies has been shown to have detrimental effects on student learning outcomes (Pintrich & Schrauben, 1992).

Elaboration strategies involve learning processes which attempt to make connections between old and new pieces of information (Dowson, 2004). Specific strategies include making deductions and drawing conclusions about presented knowledge, and applying this knowledge to past understandings and future problem-solving situations. Students who adopt elaboration strategies play an active role in constructing their own knowledge and these knowledge bases are drawn upon to enhance information recall. Particular elaboration techniques include paraphrasing, summarising, creating analogies, and active note-taking (Pintrich & Schrauben, 1992).

Organisation strategies are concerned with how students structure their knowledge. These strategies involve techniques such as ‘mind-mapping’ and creating mental images. Students who adopt these strategies may attempt to proactively identify the organisational structure of a classroom lesson. These students may also create hierarchies of knowledge and information and manipulate their knowledge structures for clarity and organisation (Dowson, 2004).

Traditionally, the elaboration and organisation strategies are thought of as corresponding to deep learning strategies whilst the rehearsal strategies correspond to surface level strategies, however, there is some debate as to whether this deep/surface, good/bad distinction is always applicable (Watkins, 2000). The next section outlines the second overarching category of learning strategies – the metacognitive strategies.
**Metacognitive Strategies**

Metacognitive strategies generally cover techniques involved in examining and controlling one’s learning patterns. Metacognition refers to both knowledge about particular cognitive states and the executive control of these states (Borkowski, 1985; Zimmerman, 1989). Therefore, metacognitive strategies are the means by which students manage their cognitive processes, and there is some debate as to whether this management occurs at a conscious or subconscious level (Paris & Winograd, 1990). The three main metacognitive strategies asserted by Marsh et al. (2006) were planning strategies (e.g., outlining goals and learning targets), monitoring strategies (e.g., ensuring material is understood), and regulation strategies (e.g., adapting learning activity to given tasks and seeking appropriate support). In addition to these, Marsh et al. include the readiness of individuals to form their own goals, students’ level of proactive action, and their appropriate interpretation of success and failures, as being vital to a conceptualisation of self-regulated learning.

Planning strategies include techniques such as setting goals for a particular task, scanning text before embarking upon reading it, and conducting task analyses. By adopting such planning goals, students are able to activate necessary prior knowledge about the task they are engaging in which assists in their comprehension and organisation of the material (McKeachie, Pintrich, Lin, & Smith, 1986). Planning strategies also involve defining learning goals and agendas for goal attainment.

Monitoring learning strategies involve processes such as tracing one’s attention during reading, monitoring the time elapsed in an exam or a set task, and assessing one’s retention and recall after a specific learning event.
Monitoring is often considered a pre-requisite for the final learning strategy, regulation, because of the focus on student attention and comprehension. Monitoring strategies alert students to breakdowns in their attention and comprehension levels, and leave the students asking questions about how to attend to these breakdowns (Tobias, 1995). Thus, these types of strategies are inherently related to the final type of learning strategies.

Regulation learning strategies involve implementing particular intervening behaviours that help to counter difficulties identified from the monitoring process. Such cognitive techniques may include slowing one’s reading speed or re-reading a passage whereby comprehension was lost. Not only does regulation involve cognitive strategies it also involves explicit behavioural attempts to rectify problems in attention and comprehension (McCombs & Marzarno, 1990). Behaviours such as asking teachers or peers for assistance are helpful ways to regulate and counter the problems highlighted in the monitoring phase. Thus self-regulated learning consists of two main categories of learning processes – cognitive and metacognitive, which combine to enhance a student’s understanding and comprehension of material, attention applied to a task, and ultimately engagement with and performance in that task.

**Positive Influences of Self-Regulated Learning**

The ability to engage in self-regulated learning by applying effective and appropriate learning strategies has been shown to be a valuable learning resource for students of a wide variety of ages and ability (Marsh et al., 2006). Furthermore, self-regulatory processes and learning strategies have been positively linked with academic achievement when students particularly
capitalise on the following procedures: (a) task analysis and goal setting; (b) holding positive self-motivational beliefs; (c) employing self-control and self-observation strategies; and (d) monitoring their performance via self-judgement and self-reaction (Purdie, Hattie, & Douglas, 1996; Zimmerman, 2002; Zimmerman & Martinez-Pons, 1990). In addition to this, studies have found that the learning and comprehension skills of low-achieving students can be greatly improved when they are coached in self-regulatory techniques and behaviours (Palincsar & Brown, 1984).

These links between self-regulation, student outcomes, and other psychological variables have been examined on a number of occasions. Many of these studies have examined pairs of relations between self-regulation and one other type of psychological influence. For example, Phalet et al. (2004) examined the relation between future goals and their instrumentality and student learning strategies. Using Biggs’ (1987) original distinction between deep and surface learning strategies, Phalet et al. (2004) reported findings which found a positive and strong link between future goals, perceived instrumental value, and a student’s use of deep learning strategies (Simons, Dewitte, & Lens, 2004; Simons, Lens, Dewitte, & Vansteenkiste, 2003). These studies also found that when students perceive their current educational tasks as being high in value for reaching their future goals, they score higher on deep learning strategies than on surface ones.

Section Summary

In summary, self-regulation has been shown to play a vital role in the prediction of academic achievement and in being related to other psychological
influences of achievement. Students’ adoption of both cognitive and metacognitive learning strategies have been highlighted as being advantageous to student learning in addition to positively influencing student learning outcomes. Whilst studies such as the one reported by Phalet et al. (2004) have examined individual components of McInerney’s revised model, rarely have studies attempted to examine the combined effect of future goals, instrumentality, achievement goals, self-concept, and self-regulation, in predicting a student’s level of engagement and achievement. The following section outlines the findings of the few studies that have attempted to examine a broader and more integrative model of the psychological influences of student achievement.

**Integrative Models of Student Achievement**

In 1994, renowned educational psychologist Paul Pintrich invited researchers to consider the need for developing an integrative model of student achievement. He highlighted the fact that most prior research had considered cognitive, motivational, and behavioural influences of learning outcomes separately and rarely in combined influence. Since then, some theorists have attempted to construct more integrative models which often became classified under the category of self-regulated learning models. Researchers emphasising the integration of cognitive, motivational, and behavioural components of student learning include Monique Boekaerts, John G. Borkowski, Paul R. Pintrich, Barry J. Zimmerman, and Raymond B. Miller. Such integrative models enable the identification of the varying psychological influences of successful learning and how they impact upon student outcomes as well as the reciprocal and recurrent relations between these psychological variables.
Whilst a complete summary of all of these integrative models is not possible here, a discussion is presented in the following sections of two of these self-regulated learning models. First, Pintrich’s (2004) model of self-regulated learning will be presented which examines the integrative effect of motivational, cognitive, and behavioural determinants of student learning and achievement. Second, a model proposed by Miller and colleagues (1996, 1999, 2004) will be discussed which incorporates the additional psychological factors of future goal orientations and instrumentality, often ignored by other integrative models. Finally, the findings of these integrative models will be integrated into the revised model of student achievement proposed by McInerney, which will be utilised in the present investigation.

**Pintrich’s Integrative Model of Student Achievement**

In his attempt to provide the field of educational psychology with an integrative model of student achievement, Pintrich (2000) described a model of self-regulated learning (SRL) that takes in account the combined influences of cognitive, motivational, behavioural, and social contextual factors in influencing student learning and performance. Underlying Pintrich’s SRL model are four main assumptions which make the model unique. The first assumption of this model is that student learners play an active participatory role in the learning process. They construct their own meanings, goals, and strategies from the information that is available to them from both internal and external sources. The second assumption is that student learners are capable of monitoring, controlling, and regulating their own cognitions, levels and types of motivation, and behaviours. Whilst the SRL model acknowledges that ultimately some external
influences play determining roles in learning (e.g., biological, developmental, and contextual individual differences), it proposes that across some, if not all learning environments, students are capable of employing some form of self-regulation. The third assumption of the SRL model is that students refer to certain guides so as to make comparisons in order to judge the progress of their learning by. These guides include goals, criteria, and standards by which they judge their learning. The final assumption of the SRL model is that the self-regulation of cognitive, motivational, and behavioural factors mediates the relation between individual and contextual characteristics of the learner, and achievement and performance outcomes. The model therefore integrates both the components of students’ contextual environments and the psychological influences of the self in determining their learning outcomes.

Rather than examining the predictive relations between different cognitive and motivational psychological variables (which is the structure of both Miller’s and McInerney’s models) the SRL model examines the simultaneous influences of cognitive, motivational, behavioural, and contextual factors across four phases of self-regulated learning. These phases are the forethought, planning, and activation phase, the monitoring phase, the control phase, and the reaction and reflection phase (Pintrich, 2004).

Across each of these phases, Pintrich (2004) proposed that self-regulatory changes can be made in the areas of cognition, motivation and affect, behaviour, and context. The cognitions available for self-regulation across these stages include goals, prior content knowledge, and metacognitive knowledge and judgements (Schunk, 2005). These goals include task-specific goals which are set and adopted in order for one to gauge their level of progress. The activation
of prior content and metacognitive knowledge can occur either naturally or through self-prompting techniques of questioning and other regulation strategies. The processes of metacognitive judgements involve beliefs about one’s level of understanding and ‘feelings of knowing’. Many of these cognitive strategies correspond to the self-regulation strategies discussed earlier (that is, rehearsal, elaboration, organisation, planning, monitoring, and regulation).

The *motivational* factors that Pintrich (2004) suggested were available for self-regulation across the four phases include: goal orientations, self-efficacy, perceptions of task difficulty, task value, and interest. Goal orientations are the reasons that learners engage in a particular task and are synonymous with the motivational achievement goals discussed earlier in the chapter. Self-efficacy refers to individuals’ beliefs about their capabilities to learn and perform specific academic behaviours. Perceptions of difficulty include the learners’ judgements about the difficulty of engaging in or learning material for a task, whilst task value refers to the learners’ perceptions of the relevance, importance, and usefulness of the task (Schunk, 2005). Finally, task interest refers to the degree of liking that a learner holds for the content material being learned or the task at hand. Other motivational influences suggested by Pintrich to influence learning include attributions, anxieties, and emotional factors.

Next, Pintrich (2004) suggested that a number of *behavioural* factors serve an important role in influencing learning across the four phases of self-regulation. These include time and effort planning, self-observation, persistence and effort, and help-seeking behaviour. For example, time and effort planning involves creating study schedules and allotting time for different activities. Self-observation involves producing behavioural monitoring criteria by which one
will base the success of their behaviours. Persistence and effort behaviours involve actively engaging in a task and creating means by which one will continue applying such effort. Finally, help seeking behaviours involve responding to behavioural and cognitive monitoring and finding ways to counter and solve difficulties one is experiencing.

Finally, Pintrich (2004) emphasised the importance of regulating one’s contextual environment by monitoring and changing either the task at hand or their contextual surroundings. Contextual task interventions involve changing, adapting, or renegotiating the academic task at hand if the inherent nature of the task is interfering with learning. Contextual environment interventions involve making changes to the immediate environmental surroundings of one’s learning environment in order to aid learning. Examples may include changing the time and study environment to control for noise and other interfering factors (Schunk, 2005).

Pintrich’s (2004) SRL model takes into account the combined influences of a large number of psychological variables across a broad range of learning environments. By doing so he allows for a more comprehensive understanding of student achievement to be gained and enables the identification of pertinent intervention areas to increase student learning outcomes. One defining factor of Pintrich’s model is that the cognitive, motivational, behavioural, and contextual factors are all examined simultaneously across different learning phases. Some research, however, has suggested that a causal ordering or predictive flow exists between the actual contextual influences, psychological factors, and student educational outcomes. Thus, the model presented in the following section
examines some of the relations between the psychological variables examined in the SRL model.

**Miller and Brickman’s Integrative Model of Student Achievement**

Upon examination of the recent integrative conceptualisations of student learning and achievement, Miller and Brickman (2004) noted that many of the contemporary efforts were focused predominantly on proximal or short-term, cognitive, motivational, and behavioural influences. Consistent with Husman and Lens (1999), Miller and Brickman suggested that the ensuing rejection of personally valued future goals in integrative models is detrimental to our understanding of student learning. They emphasised the need to include future goal orientation into the study of motivation, self-regulated learning, and achievement. In their discussion of Bandura’s (1986) social-cognitive perspective of the roles that proximal goals play in influencing achievement, they noted Bandura’s recognition of the importance of future goals. Bandura stated that “the anticipation of distal outcomes provides general direction for choosing activities, and it raises the level of involvement in them” (1986, p. 336). In their integrative model, Miller and Brickman highlight the relations between students’ future goal orientations, the perceived instrumentality of available tasks, systems of proximal sub-goals, the self-concept of ability, and some self-regulatory learning strategies. Although this is a simplified description of the actual complexity of Miller and Brickman’s model, these are the main factors that were transferred across to McInerney’s model and which will be examined within the current investigation. Research by Miller and colleagues (Brickman & Miller, 2001; Miller & Brickman, 2004; Miller et al., 1996) on
these five main psychological variables will be presented in the following section.

**Relations between Future Goals, Instrumentality, Motivation, Self-Concept, and Self-Regulation**

As outlined earlier in the chapter, goals that people hold for their futures are specifically considered ‘future-oriented’ due to the fact that performance on a current task, does not, by itself, produce the desired outcome (Miller & Brickman, 2004). Future goals are therefore considered to be a catalyst for the development of relevant proximal goals which relate directly to the current task. As shown by Nurmi (1991) the commitment to valued future goals influences the formation of a system of immediate achievement goals which are used to guide one’s action towards the attainment of a future goal. This idea is also supported by Bandura (1986) who suggested that having a context of future goal orientations gives meaning to one’s proximal behaviour.

In addition to future and proximal goals, Miller and Brickman’s (2004) model highlights the important role served by the perceived instrumentality of schooling in helping one strive towards their future goals. Their model suggests that this perceived instrumentality is vital for the development of both proximal achievement goals and proximal self-regulatory techniques, both of which assist one’s progression towards the attainment of future goals. These relations combined with a person’s feeling of efficacy surrounding a task, ultimately influence student effort and achievement. Miller and Brickman clearly emphasise the reasons underlying these patterns of relations in their integrative model. That is, when immediate academic tasks are perceived to have instrumental relations
to personally valued future goals, a learner is able to develop immediate achievement goals. When these immediate goals are combined with the level of competence the learner feels in successfully accomplishing the immediate task and the uptake and employment of immediate self-regulatory learning strategies, the result is a joint, integrative influence on student effort and achievement.

In an attempt to empirically validate parts of this integrative model, Miller and colleagues (1996) measured the relations between future consequences, immediate learning and social goals, perceived ability, self-regulation, effort, and achievement. They found that positive predictors of self-regulation included learning goals, future consequences, and the social goal of pleasing one’s teacher. Positive predictors of effort included learning goals and perceived ability which were also positive predictors of persistence. Interestingly, the only positive predictors of achievement were perceived ability and persistence. The authors emphasised in their conclusions the importance of examining the roles of all of the variables under investigation in predicting positive student outcomes. In particular, mastery (learning) goals, self-concept (perceived ability), and future consequences (future goals) were attributed as playing positive roles in the prediction of positive student outcomes.

In addition to these findings, a follow-up study by Brickman and Miller (1998) examined the additional influence of perceived instrumental value in predicting positive outcomes. Instrumentality was found to have a positive influence on self-regulation, deep-processing strategies, and persistence, adding further support to Miller and Brickman’s (2004; Brickman & Miller, 2001) integrative model.
In their concluding statements and suggestions for future research and interventions, Miller and Brickman (2004) stated the following. First, that too little research had been conducted on future goals, perceived instrumentality, and their relations to other psychological variables and student outcomes. Next, they emphasised the need to empirically utilise their integrative model (including future goals and instrumentality) in order to gain a complete picture of student learning and achievement. When such comprehensive models are employed it is possible to determine which psychological variables are making the most important, unique contributions to student achievement. Once these factors have been identified, it is possible to specifically target those areas with successful interventions. Finally, they emphasised the importance of always examining such integrative models within the broader socio-cultural context of the student learner. They emphasised that the determinants of the psychological variables within their integrative model, particularly future goal orientation, are often derived from information available to students from their socio-cultural environments. Thus, they recommended that future studies should ensure that their research is appropriately situated within this contextual understanding.

Section Summary

Miller and Brickman’s (2004; Brickman & Miller, 2001; Miller et al., 1996) integrative model of student achievement offers a unique and more comprehensive approach to enhancing our understanding of what makes students learn and perform at school. Sections of the model take into account students’ future goals, perceived instrumentality, motivational goals, self-concept, and self-regulatory strategies, and situate them within the broader learning and socio-
cultural context. This conceptualisation was built on by McInerney and provides the underlying basis for the current investigation.

McInerney’s (2007) Revised Model of Student Achievement in PNG

Drawing from a number of integrative models of student learning, McInerney’s (2007) revised model of student achievement proposes predictive and directional relations between five main psychological variables. Like Miller and Brickman’s (2004) model, McInerney also situates the model within the broader context of the student’s socio-cultural environment. As shown earlier in Figure 3.1, future goals and their perceived instrumentality, influence students’ motivational goal orientations, self-concept, and self-regulation, which when combined, influence students’ effort and achievement outcomes.

As outlined in the sections above, a large and extremely widespread amount of research has examined the relations posited in the model of student achievement used in this research. Firstly, there appears to be strong support for the relations between holding positive future goals and valuing the instrumentality of immediate learning tasks and: (a) motivational orientation, (b) employing effective learning strategies, (c) increased effort and persistence, and (d) positive student outcomes (Phalet et al., 2004). Secondly, there is strong evidence for the relations between different motivational orientations, students’ academic self-concept, and students’ use of self-regulatory techniques, learning strategies, and academic engagement and achievement (Marsh & Craven, 1997; 2006; McInerney et al., 2001). Finally, there is clear evidence supporting the strong link between effective self-regulatory techniques and school performance (Marsh et al., 2006).
What is not clear within an integrative approach is an understanding of the differential and combined effects of such psychological constructs on student learning and achievement. As emphasised, however, by Pintrich (1994, 2004) and others, it is vital that an integrative approach to understanding these factors is employed if we are to ever gain a complete picture. Pintrich also emphasised the importance of expanding such a framework to the examination of student learning in cross-cultural settings (Schunk, 2005). He suggested that different relations may exist among, for example, goal orientations and self-regulation outcomes depending on their cultural background, and he urged researchers to consider how learning might be regulated by ethnicity (Pintrich & Zusho, 2002).

Therefore, the current study aimed to examine the effort and achievement of Papua New Guinean students within the context of an integrated model of learning. The five aspects of McInerney’s revised model were examined within the socio-cultural context of three regions across PNG. Prior research on the psychological characteristics of the student in PNG is extremely limited. Nelson et al. (2004) confirmed the relations between mastery and social goal orientations and deep learning processes and the relations between performance goal orientations and surface learning processes amongst students from PNG, as has been found in a myriad of other cultures (Watkins et al., 2002). Furthermore, Demerath (2000) identified certain characteristics of the PNG student (use of language, knowledge, work, and aspirations), which in the context of an anti-academic climate, results in poor academic engagement and achievement.

Some research has also been conducted in PNG examining the perceived instrumental value and relevance of schooling. Ethnographic studies by Demerath (1999, 2000) have found that in PNG the “connection between
schooling and work [is] so unclear” and that there is “enormous frustration among students whose expectations for cash employment have been raised by secondary schooling” (2000, p. 201). He concluded that the importance of education for getting a job, becoming a successful adult, and increasing one’s economic and social security (as shown in other settings), was irrelevant for students of PNG.

Alternatively, Nelson et al. (2004), in their study of students in two village schools and one city school in PNG, found that students in PNG were more globally, intrinsically, and socially motivated than students in Australia. They suggested that despite limited educational and occupational opportunities, students from PNG still hold strong motivational goal orientations and perceived the value in their current schooling experience.

The research, however, in PNG is extremely limited. It is unknown as to what predictors other than certain socio-cultural influences play a role in student engagement and achievement. Due to the developing nation status of PNG, and the detrimental effects that many of these uncontrollable socio-economic factors can have on student learning, it is vital that further research attempts to identify other, controllable influences of achievement to inform intervention. As stated earlier in the chapter, intervening at a social, cultural, or economical level is often impossible, due to the influence of external, uncontrollable factors. Therefore, the identification of potential areas for cognitive, motivational, and behavioural interventions provides educators, researchers, and policy makers with potentially powerful tools for intervention. Such interventions can be targeted at the level of the student, teacher, and parent rather than attempting to
Section Summary

This section has outlined the underlying psychological influences of student learning and achievement outcomes as conceptualised by Brickman and Miller and McInerney’s revised model of achievement. The identification of salient psychological influences in the schooling experiences of PNG school students is the primary aim of the current investigation. Despite the enormous power that can be gained by identifying the vital psychological influences of achievement at the student level, it would be neglectful to completely ignore the external influences in Fordham and Ogbu’s (1986) theory that were outlined earlier in the chapter. Thus, McInerney’s revised model is situated within the socio-contextual environment of the student learner and recognises the importance of examining such influences. Therefore, a secondary aim of the current study was to explore these external influences of students’ educational experiences. The following final section examines two of these external influences - the role of the school and classroom environment and the role of the family in contributing to student learning and achievement.

External Influences of the School and Family

The Role of the School

According to Okagaki (2001), the structure of the school and the role of the teacher, contribute to students’ responses to and motivation for schooling. It has been argued that the form or structure of education and the characteristics of a
teacher have the potential to elicit resistance to school from children. There are several characteristics of the form of the school that research has highlighted as eliciting this resistance to school from children. These include the compulsory nature of schooling, organisation of classroom activities, friendship formation amongst students, teacher-student relationships, and the public ranking of students (D’Amato, 1993; Okagaki, 2001). Furthermore, studies examining student resistance in minority education have suggested that modest changes in the instructional practices of the school can facilitate the performance of underachievers (Vogt, Jordan, & Tharp, 1993). These minority studies have suggested three main domains in which educators can improve learning for student underachievers – small versus whole group learning, continuity between home and school cultures, and teacher communication characteristics.

Studies have found that allowing students to work together in small group learning centres as opposed to whole-class instruction and independent situations greatly facilitates student learning and achievement (Vogt et al., 1993). Vogt et al. proposed that this enhancement was due to the similarities between these small groups and peer-assisted settings and students’ own cultural and social structure. By creating greater congruence between their home and school cultures, students are better able to adjust to the school environment and focus on learning.

Related to this group learning is the external influence that creating continuity between a student’s home and school environments can have on their learning. Cross-cultural research has highlighted a number of ways in which discontinuity between home and school environments can interfere with students’ school learning, due to teacher-student misunderstandings, and
students’ abilities to discern certain culturally irrelevant situations (Okagaki, 2001). For example, studies among Native American students have found that discontinuity between their home environment (which emphasised sharing, cooperation, and group needs) and their school environment (which emphasised competition and grading) inhibited students’ full learning potential (Sanders, 1987). These Native American children were often perceived by their teachers and other mainstream students as being ‘unmotivated’ because of their unwillingness to participate in competition and inability to participate in classroom debates. The minority students were often unable to participate on an individual basis in the classroom and preferred to engage in ‘choral’ responses. This behaviour was often viewed as ‘withdrawn’ and ‘unsociable’ and inhibited these students’ involvement in vital classroom activities (Greenbaum, 1985).

In addition to the continuity between students’ home and school environments, certain characteristics of the teacher have been identified has having an influence on a student’s level of engagement in school. One such characteristic that has been identified is that of teacher communication. According to Tharp (1989), in order for teachers to encourage students’ participation in classroom discussions, they must adhere to and consider the sociolinguistic conventions of the local culture. Techniques such as increasing the amount of time teachers waited for students to verbally participate and the employment of communication strategies, such as overlapping speech, have been found to facilitate student involvement in learning. Positive student-teacher relations, characterised by open, flexible, and honest communication, have also been found to be significantly related to academic resilience in minority students (Borman & Rachuba, 2001).
Thus, school characteristics such as group learning, home-school continuity, and teacher characteristics have been identified as contributing to the student learning process. Some of these external, school related factors have been examined in PNG. The following section outlines these findings.

**Evidence in PNG for the Role of the School**

Although limited, research in PNG has also emphasised the role of the school and the teacher as being fundamental to a student’s learning and achievement potential. Avei (1996) stressed the importance of the school curriculum being formed in conjunction with the communities that students come from and in “educating villagers about education, so that they can take a more meaningful role” (p. 124). Avei concluded that there is a need to create more continuity between students’ home and school environments and to increase community understanding of the schooling experience. Demerath (1999), however, pointed out the various difficulties that can arise for students, educators, and schools, in the struggle to integrate opposing home and school cultures.

Teacher communication has also been investigated in PNG schools, and research suggests similar findings to prior research reported above. Studies have found that the most effective forms of communication involve clearly expressing the goals of the school to all students and staff, having approachable, friendly staff members and headmasters, and employing an efficient, yet flexible democratic leadership (Sengi, 1995; Vulliamy, 1987; Weeks, 1990).
Thus, external school and teacher influences do play a role in predicting student learning and achievement. The second external factor that also contributes to this is the role of the family and the community.

The Role of the Family

In addition to the way in which students perceive the utility of education in their lives, many cultural norms, beliefs, and practices held by communities and families have been shown to have an influence on student engagement and achievement. Parental expectations for their child’s school achievement, their beliefs about intelligence and the goals of schooling, and their perceptions of their own academic efficacy, have all been shown to play a role in contributing to their child’s academic outcomes (see Okagaki, 2001). Such beliefs result in parenting practices which make a difference to the way in which families approach education, ultimately influencing students’ support networks, the way in which they learn, and the level of performance they demonstrate in class (Okagaki).

Other pertinent factors that have been shown to influence student learning are the expectations that parents hold for their children. Some research has investigated the types of parent and community expectations of their child’s success in school and how these differ cross-culturally (Okagaki & Frensch, 1998). Expectations range anywhere between what level of schooling parents expect their children to reach, to what grades they expect their children to achieve in class. Furthermore, Okagaki suggested that if parental “expectations are to be translated into meaningful improvements in children’s school achievement, then educators need to be very clear about what constitutes doing
well” (2001, p. 14). If the discrepancy between the school and home environment is to be minimised, parent and teacher expectations must be as closely congruent with one another in emphasising what it means for a student to achieve in school.

A second family related characteristic that influences student education and development are the goals that parents hold in regards to what they believe the teacher should be teaching their child. Originally discussed by Kohn (1969), this idea postulates that parents’ social contexts influence the goals and values they have for their children, resulting in differing parenting practices, in turn resulting in differences in child motivation, achievement, and engagement. In their work with minority students in cross-cultural settings, Okagaki and Sternberg (1993) found that parents of minority students gave high importance to teaching socially conforming behaviours (over socially autonomous behaviours) to their children. They rated learning how to complete neat and orderly work as just as important (if not more) as learning basic facts and developing problem-solving skills and creativity. These ratings were different to Western parents’ goals that emphasised the importance of cognitive skills and intelligence. Furthermore, they found that minority parents had a somewhat ‘broader’ view of intelligence and the goals of teaching than did Anglo-American parents. Minority parents emphasised the importance of teaching non-cognitive skills and attributes such as motivation, and practical and social skills, as well as cognitive ones.

How do these findings relate to student achievement? Okagaki and Sternberg (1993) suggest that a positive relation will exist between parental goals and student achievement when there is no discrepancy between the home and school environments. Thus, a student is more likely to achieve positive academic
outcomes when both their parents’ and their schools’ educational goals are congruent.

A third influence that comes from the family, are parents’ beliefs about what constitutes an intelligent child. Okagaki and Sternberg (1993) found that for minority students (who were also classified as coming from collectivist cultures), *effort* was the most important characteristic of their parents’ conceptions of intelligence. Cross-cultural research has found similar findings for students from East Asia who attribute success in school to effort rather than innate ability (Holloway, 1988). Again, differences in parental and school definitions of ‘intelligence’ and ‘success’ may have the potential to influence student engagement and achievement in PNG.

A small amount of research has examined parental conceptions of intelligence in developing countries and has highlighted the broader perspective in which parents view intelligence and achievement. For example, Dasen’s (1984) study of African ‘social intelligence’ revealed the substantial emphasis parents placed on social attributes such as service, responsibility, honesty, wisdom, observation, and respect, in defining an intelligent student. Furthermore, traditionally Western cognitive skills, such as spatial ability and reasoning, were not valued and were not related to their overall view of intelligence. This research however did not examine the similarities and / or differences between home conceptions of intelligence and school conceptions of intelligence. Further research needs to examine these two phenomena in relation to student outcomes.

Finally, parents’ perceptions of their own ability to help their child succeed at school have been shown to play a role in student learning. It has been suggested by Okagaki (2001) that parental involvement can take the form of
either direct or indirect involvement. The direct pathways involve literal parental engagement with both student homework as well as their involvement in intellectually stimulating activities. This help can be effective depending on the parent’s own level of education and efficacy. Activities may range from direct assistance with assignments and school exercises, to reading with their child, to exam preparation. However, particularly in minority settings and perhaps more so in developing settings, parents’ own ability and perception of their efficacy limits their ability to assist their children along these direct pathways.

Parents are still able to assist students even if they are unable to provide effective instrumental help, via encouragement, indirect help, and holding high expectations. Indirect help, such as time management, creating an academic climate at home, and parental encouragement, has been shown to successfully help immigrant students achieve in Central America (Suarez-Orozco, 1993). Activities involved in these indirect pathways do not require parents to have a high level of education of even perceived ability. Rather, they require the parent to take an interest in their child’s education and create ways in which the environment their child is raised in can be conducive to productive learning.

Evidence in PNG for the Role of the Family

Studies in PNG have examined a small number of parental influences that have been shown to effect aspects of student engagement and achievement. Demerath (2000), in his study of Manus villagers in PNG, found a lack of strong parental involvement in their children’s education, which often left students with the freedom to independently construct what schooling meant for them. Their
parents held little or no expectations for their achievement which often resulted in the loss of student motivation for academic engagement.

A study in a village school in PNG by Guy (1996) reported large discrepancies between students’ home and school environments in the expectations that parents and teachers held for students. He found that many parents considered their children’s education to be predominately irrelevant for life in the village and they were dissatisfied with the school because it did not support the cultural life and traditions of the village. Whilst teachers were preparing students with skills and knowledge for life in the workforce, parents and communities were emphasising the importance of preparing their children for a village-based subsistence living (Avei, 1996).

Generally in PNG, the main source of support from parents comes from indirect help and encouragement. Many parents themselves are not educated and make their own living in the village. Swatridge (1987) investigated the degree of parental involvement in PNG students’ academic lives. He suggested that parents were often not involved in their child’s schooling due to three reasons: physical and cultural distance between school and home; traditional attitudes; and ambivalence towards the value of education in their child’s and their own lives. This lack of parental involvement meant that students did not have an alternative source of academic support, often leading to higher rates of student disengagement and low achievement (Demerath, 2000).

In addition to this lack of direct help amongst PNG families, indirect help in the form of time management is also a problem, because a large amount of time outside of school hours is designated to chores, village life, and travelling to and from school (Demerath, 1999, 2000; Nelson et al., 2004). The combination
of poverty and harsh environmental conditions in PNG means that families must designate many hours to creating a self-sustaining lifestyle in which education is often not made a priority. Thus, according to some studies, students in developing countries tend to not benefit from their parents’ involvement and assistance in their education.

Section Summary

Research in PNG needs to be expanded in order to gain a more thorough understanding of the external and internal influences of student learning processes. This section has highlighted the role that the external influences of the school and the family might serve in contributing to a student’s educational experience. The role of group-learning, home-school continuity, and teacher communication at the school level, and expectations, goals, conceptions of intelligence, and feelings of efficacy at the parent level, were examined. In addition to this, the small amount of research that has been conducted in PNG examining these external influences was discussed.

Summary

As far as the author is aware, a model established within a theoretically strong integrative framework (that includes future goal orientation, perceived instrumentality, motivational goals, self-concept, and self-regulation), and that utilises sophisticated statistical methodologies, has never been tested in any developing country including PNG. In order to gain a deeper understanding of the influences of student achievement, an integrative model, McInerney’s revised model of student achievement, will be utilised to explore the psychological underpinnings of student learning across three regions in PNG. In addition to the
internal, psychological influences of achievement, some of the external influences of the school, teacher, and parent will also be included in the study’s conceptualisation of student learning. The current chapter has presented a literature review examining the theories and research underlying the five psychological factors and two external factors pertinent to the present study. The following chapter presents the hypotheses and research questions that were developed to address the key components of the study and a rationale is given for these based upon current theory and research.
CHAPTER FOUR

HYPOTHESES, RESEARCH QUESTIONS, AND THEIR RATIONALE

Introduction

The primary purpose of the present investigation is to empirically evaluate a model of student achievement that explores the relations between socio-economic predictors, psychological constructs, and student learning outcomes. In particular, the study aims to examine the appropriateness of McInerney’s (2007) revised model of student achievement for use in explaining student outcomes in PNG. Three interrelated studies were devised to address the purposes of this investigation. Study 1 involves examining the psychometric properties and invariance of the instrumentation used to measure the psychological variables of interest, as well as to examine the similarities and differences in student profiles across gender, grade, and region. Study 2 involves examining the appropriateness of McInerney’s revised model of student achievement in PNG and investigating the relations between the socio-economic variables, the psychological variables, and student outcome measures. Finally, Study 3 involves a qualitative investigation of future goals, perceived instrumental value, motivation, self-concept, and self-regulation, and how students, teachers, and parents relate these variables to student outcomes. The purpose of the current chapter is to present separately for each of the three components of the present research: (a) the nature of the problem; (b) the aims; (c) the specific hypotheses to be tested; (d) the research questions to be addressed; and (e) the rationale for such concerns. Hypothesised predictions were conceptualised based on theory and research presented in the previous chapter.
Where past research and theory provide little direction for clear predictions to be made, research questions have been formulated.

**Study 1: The Structure and Nature of Future Goals, Perceived Instrumental Value, Motivation, Self-Concept, and Self-Regulation**

**The Problem**

The purpose of the first study of the investigation was to evaluate the psychometric properties and invariance of the instrumentation as well as to measure the psychological profiles of PNG students across gender, grade, and regional groups. The following overarching questions were posed. Can future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation be measured in PNG with psychometrically sound instrumentation? Can the similarities and differences in these psychological profiles be determined across gender, grade, and regional groups in PNG? The following aims were constructed in order to address these problems.

**Aims**

The aims of Study 1 are to:

(a) Examine the psychometric properties of the Future Goals Questionnaire-PNG (FGO-PNG), the Inventory of School Motivation (ISM), the Self-Description Questionnaire II Short (SDQ-IIS) (academic items), and the Goal Orientation and Learning Strategies Survey (GOALS-S) to determine if they are *valid* measures of future goals and perceived instrumental value, motivation, self-concept, and self-regulation for PNG students;
(b) Examine the psychometric properties of the aforementioned instrumentation to determine if they are reliable measures of future goals and perceived instrumental value, motivation, self-concept, and self-regulation for PNG students;

(c) Examine the invariance in factor structure of the instrumentation across PNG groups of gender, grade, and region; and

(d) Examine the similarities and differences in psychological profiles for PNG students across gender, grade, and region.

In order to investigate these aims the following hypotheses and research questions have been postulated.

**Statement of Hypotheses and Research Questions**

**Motivational Goal Orientation**

**Hypothesis 1.1: Factor structure of the ISM.** PNG students’ responses to the Inventory of School Motivation (ISM) will support the multidimensional model of motivation in that the eight *a-priori* first-order and three *a-priori* higher-order goal orientation factors will be identified by confirmatory factor analysis (CFA). See Figure 4.1 for a pictorial representation of this factor structure.

**Hypothesis 2.1: Reliability of the ISM.** The ISM will be a reliable measure of the eight first-order (task, effort, competition, social power, praise, token, affiliation, and social concern) and the three higher-order (mastery, performance, and social) facets of PNG student motivation.
Figure 4.1. Factor structure of the motivation scales of the ISM

Note. Task = task motivation; Effort = effort motivation; Comp = competition motivation; Power = social power motivation; Praise = praise motivation; Token = token motivation; Affil = affiliation motivation; Conc = social concern motivation

**Hypothesis 3.1: Factorial invariance of the ISM across PNG groups.**

The factor structure of the ISM will be similar across gender, grade, and region as demonstrated by structural equation modelling (SEM) tests of invariance.

**Research question 4.1a: Gender differences for the ISM.** Are there gender differences across the eight first-order and three higher-order factors of motivation for urban, village, and rural students?

**Research question 4.1b: Grade differences for the ISM.** Are there grade differences across the eight first-order and three higher-order factors of motivation for urban, village, and rural students?

**Research question 4.1c: Gender x grade interaction effects for the ISM.** Are the ISM gender by grade interaction patterns similar or different across urban, rural, and village regions in PNG?
Future Goal Orientation

Hypothesis 1.2: Factor structure of the future goal scales of the FGQ-PNG. PNG students’ responses to the Future Goals Questionnaire-PNG (FGQ-PNG) will support the validity of a three-factor model of future goal orientation in that the success, authority, and village goal orientation factors will be identified by CFA. This model is represented pictorially in Figure 4.2.

![Factor structure of the future goal scales of the FGQ-PNG](image)

Figure 4.2. Factor structure of the future goal scales of the FGQ-PNG

Hypothesis 2.2: Reliability of the future goal scales of the FGQ-PNG. The FGQ-PNG will be a reliable measure of the three facets of future goal orientation (success, authority, and village) for PNG students.

Hypothesis 3.2: Factorial invariance of the future goal scales of the FGQ-PNG across PNG groups. The factor structure of the FGQ-PNG will be similar across gender, grade, and region as demonstrated by SEM tests of invariance.

Research question 4.2a: Gender differences for the future goal scales of the FGQ-PNG. Are there gender differences across the three factors of future goal orientation for urban, rural, and village PNG students?
Research question 4.2b: Grade differences for the future goal scales of the FGQ-PNG. Are there grade differences across the three factors of future goal orientation for urban, rural, and village PNG students?

Research question 4.2c: Gender x grade interaction effects for the future goal scales of the FGQ-PNG. Are the FGQ-PNG gender by grade interaction patterns similar or different across urban, rural, and village regions in PNG?

Perceived Instrumental Value

Hypothesis 1.3: Factor structure for the perceived instrumental value scales of the FGQ-PNG. PNG students’ responses to the FGQ-PNG will support the validity of the six-factor model of future goal orientation and perceived instrumental value in that the success, authority, and village goal orientation and instrumental value factors will be identified by CFA. All six factors are measured by the FGQ-PNG and the six factor model of future goal orientation and perceived instrumental value is displayed in Figure 4.3.

Hypothesis 2.3: Reliability of the perceived instrumental value scales of the FGQ-PNG. The FGQ-PNG will be a reliable measure of the additional three perceived instrumental value factors (success, authority, and village) for PNG students.
Figure 4.3. Factor structure of the future goal and perceived instrumental value scales of the FGQ-PNG

Note. Success FG = success future goals; Authority FG = authority future goals; Village FG = village future goals; Success IV = success perceived instrumental value; Authority IV = authority perceived instrumental value; Village IV = village perceived instrumental value

Hypothesis 3.3: Factorial invariance of the perceived instrumental value scales of the FGQ-PNG across PNG groups. The factor structure of the six-factor future goals and perceived instrumental value model will be similar across gender, grade, and region as demonstrated by SEM tests of invariance.

Research question 4.3a: Gender differences for the perceived instrumental value scales of the FGQ-PNG. Are there gender differences across the three factors of perceived instrumental value for urban, rural, and village PNG students?

Research question 4.3b: Grade differences for the perceived instrumental value scales of the FGQ-PNG. Are there grade differences across the three factors of perceived instrumental value for urban, rural, and village PNG students?

Research question 4.3c: Gender x grade interaction effects for the perceived instrumental value scales of the FGQ-PNG. Are the FGQ-PNG
gender by grade interaction patterns similar or different across urban, rural, and village regions in PNG?

**Self-Concept**

**Hypothesis 1.4: Factor structure of the SDQII-S academic scales.** PNG students’ responses to the academic items of the Self-Description Questionnaire II-Short (SDQII-S) will support the *validity* of the three-factor model of self-concept in that general academic, English, and mathematics self-concept factors will be identified by CFA. This model is depicted pictorially in Figure 4.4.

![Factor structure of the academic self-concept scales of the SDQII-S](image)

*Figure 4.4. Factor structure of the academic self-concept scales of the SDQII-S*

*Note.* General SC = general self-concept; English SC = English self-concept; Maths SC = mathematics self-concept

**Hypothesis 2.4: Reliability of the SDQII-S academic scales.** The SDQII-S will be a *reliable* measure of the three facets of self-concept (general, English, and mathematics) for PNG students.

**Hypothesis 3.4: Factorial invariance of the SDQII-S academic scales across PNG groups.** The factor structure of the SDQII-S academic scales will be similar across gender, grade, and region as demonstrated by SEM tests of invariance.
**Research question 4.4a: Gender differences for the SDQII-S academic scales.** Are there *gender* differences across the three factors of self-concept for urban, rural, and village students?

**Research question 4.4b: Grade differences for the SDQII-S academic scales.** Are there *grade* differences across the three factors of self-concept for urban, rural, and village students?

**Research question 4.4c: Gender x grade interaction effects for the SDQII-S academic scales.** Are the SDQII-S *gender by grade interaction* patterns similar or different across urban, rural, and village regions in PNG?

**Self-Regulation**

**Hypothesis 1.5: Factor structure of the GOALS-S.** PNG students’ responses to the Goal Orientation and Learning Strategies Survey (GOALS-S) will support the *validity* of the six-factor model of self-regulation in that the elaboration, rehearsal, organisation, planning, monitoring, and regulating learning strategy factors will be identified by CFA. See Figure 4.5 for a pictorial representation of this model.

**Hypothesis 2.5: Reliability of the GOALS-S.** The GOALS-S will be a *reliable* measure of the six facets of learning strategies (elaboration, rehearsal, organisation, planning, monitoring, and regulating) for PNG students.
Figure 4.5. Factor structure of the self-regulation scales of the GOALS-S

Note. ELAB = elaboration; REH = rehearsal; ORG = organisation; PLAN = planning; MON = monitoring; REG = regulating

**Hypothesis 3.5: Factorial invariance of the GOALS-S across PNG groups.** The factor structure of the GOALS-S will be similar across gender, grade, and region as demonstrated by SEM tests of invariance.

**Research question 4.5a: Gender differences for the GOALS-S.** Are there gender differences across the six factors of self-regulation for urban, rural, and village students?

**Research question 4.5b: Grade differences for the GOALS-S.** Are there grade differences across the six factors of self-regulation for urban, rural, and village students?

**Research question 4.5c: Gender x grade interaction effects for the GOALS-S.** Are the GOALS-S gender by grade interaction patterns similar or different across urban, rural, and village regions in PNG?

To summarise, for each of the psychological constructs relevant to integrated model of student achievement that will be utilised in the present study, four aims were posed from which a series of hypotheses and research questions were posed in relation to each instrument.
Rationale for Hypotheses and Research Questions for Study 1

In the section following a brief rationale will be given for the hypotheses and research questions presented in Study 1. These hypotheses and research questions are based on the literature review presented in Chapter 3.

Motivational Goal Orientation

Rationale for Hypotheses 1.1 to 3.1. Motivational goal orientation has been linked with student outcome measures on numerous occasions (Covington, 2000). Many models have been put forth and many instruments devised in order to test these relations. One such model and corresponding instrument, the ISM, is based on achievement goal theory and has been tested across a vast array of cultural settings. McInerney and his associates (McInerney, et al., 1997; McInerney & Ali, 2006; see also Ali, 2006) have examined the psychometric properties of the ISM and have found it to have good psychometric properties across a number of cultural settings (including Navajo Americans, Indigenous Australians, and South Africans). The ISM has been shown to be a valid and reliable measure of its eight first-order task, effort, praise, extrinsic, competition, social status, affiliation, and concern factors, as well as its higher-order mastery, performance, and social goal factors. The scale has demonstrated acceptable reliabilities, with the ISM Cronbach’s alphas ranging from .66 to .82, with an average alpha of .73 (McInerney & Ali, 2006).

This instrument has not been previously examined in such settings as the current study, defined as Indigenous, developing, and containing a majority population. Based, however, on the instrument’s strong theoretical underpinning and the thorough methodological processes that were employed in developing the
instrument, it was hypothesised that the reliabilities of the ISM scales would be satisfactory, the *a-priori* factor structure supported, and the factor structure invariant across gender, grade, and region for PNG students.

**Rationale for Research questions 4.1a to 4.1c.** Given that rarely has research investigated the relations between psychological variables and academic outcomes in PNG, and hence there is a lack of available research evidence on which to base hypotheses, it was necessary to posit a series of research questions to determine whether or not there are any differences between males and females, across grades, or across regions in PNG for motivational goal orientation. Thus, similarities and differences will be examined across the eight first-order and the three-higher order motivation factors.

**Future Goal Orientation and Perceived Instrumental Value**

**Rationale for Hypotheses 1.2 to 3.2 and 1.3 to 3.3.** The FGQ-PNG was developed to measure students’ specific future goals and students’ perceived instrumental value of schooling to help them attain those goals, across a number of domains. Although it was necessary to examine the psychometric properties of the future goals and perceived instrumental value scales separately, the rationale behind the analyses is consistent across the two related dimensions. The instrument has been previously tested in PNG (Nelson, McInerney, Craven, & Dowson, 2006) whereby a three-factor model (success, authority, and village) of future goal orientation and perceived instrumentality was supported. The instrument has also been shown to have acceptable psychometric properties. Therefore, it was hypothesised that the FGQ-PNG would be a reliable measure of the three *a-priori* future goal and perceived instrumental value factors (namely
success, authority, and village goals), and that this factor structure would be invariant across gender, grade, and region.

**Rationale for Research questions 4.2a to 4.2c and 4.3a to 4.3c.** Again, it is not possible to hypothesise about the gender, grade, and region similarities and differences for future goal orientation or perceived instrumental value, since these relations have not been examined before in PNG. Therefore, research questions were devised asking whether there would be gender, grade, and region differences in students’ endorsement of the three types of future goals and perceived instrumental value of schooling in attaining those goals.

**Self-Concept**

**Rationale for Hypotheses 1.4 to 3.4.** Self-concept has been widely studied in numerous settings. Changes from traditional unidimensional conceptualisations of self-concept to the more recent multidimensional view of self-concept are present in the literature (Marsh, 1989, 1992; Marsh, Byrne, & Shavelson, 1988). The academic items of the SDQII-S were developed, based on this multidimensional view of self-concept, and the instrument therefore measures three separate types of academically related self-concept – general, English, and mathematics. The SDQII-S has been applied across a number of educational and cultural settings in which the *a-priori* three-factor solution has clearly emerged and the reliability estimates for each of the scales has been high, often ranging from .80 to .95 (Marsh, 1990). Therefore, in the current study it was hypothesised that the three-factor *a-priori* solution would also emerge from the PNG data, that the three scales would demonstrate acceptable reliability
estimates, and that the factor structure would be invariant across gender, grade, and region.

Rationale for Research Questions 4.4a to 4.4c. Consistent with motivational goal orientation, future goal orientation, and perceived instrumental value, it was not possible to produce hypotheses relating to gender, grade, and region differences for PNG students’ self-concept. Therefore, three research questions were put forth, asking what the self-concept profiles would be of PNG students across gender, grade, and region.

Self-Regulation

Rationale for Hypotheses 1.5 to 3.5. Self-regulatory learning strategies have also been shown on a number of occasions to be related to outcome measures and other psychological variables. The GOALS-S was developed to measure six facets of self-regulation – elaboration, rehearsal, organisation, planning, monitoring, and regulating strategies. The GOALS-S has demonstrated good factor structure and reliabilities in past research with Cronbach’s alphas ranging from .73 to .83 (Dowson & McInerney, 2004). It is therefore hypothesised that the six-factor a-priori factor structure will emerge from the PNG data, that all factors will demonstrate acceptable reliability estimates, and that the factor structure will be invariant across gender, grade, and region.

Rationale for Research questions 4.5a to 4.5c. It is not possible to predict whether or not there would be differences across gender, grade, and region for PNG students on the six factors of self-regulation given the lack of research in PNG pertaining to this construct. Therefore, three research questions
were posited asking what the student self-regulation profiles would look like across gender, grade, and region.

Section Summary

This section has presented the aims, hypotheses, research questions, and their rationale for the first study of the current investigation. Four aims were put forth to explore the psychometric properties (validity and reliability), factorial invariance, and student profiles for each measure. The following section outlines the aims, hypotheses, research questions, and their rationale for the second study of the investigation which examines the relations between student socioeconomic variables, psychological influences, and learning outcome measures.

Study 2: The Relations between Future Goals, Perceived Instrumental Value, Motivation, Self-Concept, and Self-Regulation and Student Outcome Variables

The Problem

In order to address the overarching aim of the second study the following question was posed. Within the context of an integrative model of psycho-social influences on academic achievement for developing nations, what are the relations between PNG students’ socio-economic predictors, future goal orientation, perceived instrumental value, motivational goal orientation, self-concept, self-regulation, and academic outcome measures? The following aims were put forth to address these problems.
**Aims**

The aims of Study 2 were to:

(a) Examine the individual and separate relations between the socio-economic variables, each of the psychological variables (future goal orientation, perceived instrumental value, motivation, self-concept [domain specific and domain general], and self-regulation) and PNG student outcome measures (achievement and effort);

(b) Examine the similarities and differences in the paths between student outcomes and future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation, across gender, grade, and region;

(c) Examine the interaction between future goals and their perceived instrumental value in predicting outcome variables;

(d) Examine the correlations and predictive paths of McInerney’s revised model of student achievement within a PNG context.

In order to investigate the above aims the following research questions were proposed.

**Statement of the Research Questions for Study 2**

**Future Goal Orientation**

*Research question 1.1: Relations between future goal orientation, socio-economic variables, and student achievement.* What are the relations between the socio-economic variables, future goal orientation, and student achievement as indicated by structural equation modelling?
**Research question 1.2: Relations between future goal orientation, socio-economic variables, and student effort.** What are the relations between the socio-economic variables, future goal orientation, and student effort as indicated by structural equation modelling?

**Perceived Instrumental Value**

**Research question 1.3: Relations between perceived instrumental value, socio-economic variables, and student achievement.** What are the relations between the socio-economic variables, perceived instrumental value, and student achievement as indicated by structural equation modelling?

**Research question 1.4: Relations between perceived instrumental value, socio-economic variables, and student effort.** What are the relations between the socio-economic variables, perceived instrumental value, and student effort as indicated by structural equation modelling?

**Motivation**

**Research question and Hypothesis 1.5: Relations between motivational orientation, socio-economic variables, and student achievement.** What are the relations between the socio-economic variables, motivational goal orientation, and student achievement as indicated by structural equation modelling? It is expected that mastery goal orientations (including task and effort first-order factors) will be positively related to student achievement, whilst performance goal orientations (including competition, social power, token, and praise first-order factors) will be negatively related to student achievement.
Research Question and Hypothesis 1.6: Relations between motivational orientation, socio-economic variables, and student effort. What are the relations between the socio-economic variables, motivational goal orientation, and student effort as indicated by structural equation modelling? In line with Research Question and Hypothesis 1.5, it is anticipated that mastery goal orientations will be positively related to student effort outcomes, whilst the performance goal orientations will be negatively related to student effort.

Self-Concept

Hypothesis 1.7a: Relations between self-concept, socio-economic variables, and student achievement. There will be significant relations between the socio-economic variables, self-concept, and student achievement as indicated by structural equation modelling. Specifically, positive maths, English, and general self-concept will be positively related to the socio-economic variables and student achievement.

Hypothesis 1.8a: Relations between self-concept, socio-economic variables, and student effort. There will be significant relations between the socio-economic variables, self-concept, and student effort as indicated by structural equation modelling. Specifically, positive maths, English, and general self-concept will be positively related to the socio-economic variables and student effort.

Domain-Specific Self-Concept

Hypothesis 1.7b: Relations between domain specific self-concept, socio-economic variables, and student achievement. There will be significant relations
between the socio-economic variables, domain specific (English and mathematics) self-concept, and domain specific student achievement as indicated by structural equation modelling. Specifically, maths self-concept will be positively related to maths achievement and English self-concept will be positively related to English achievement.

**Hypothesis 1.8b: Relations between domain specific self-concept, socio-economic variables, and student effort.** There will be significant relations between the socio-economic variables, domain specific (English and mathematics) self-concept, and domain specific student effort as indicated by structural equation modelling. Specifically, maths self-concept will be positively related to maths effort and English self-concept will be positively related to English effort.

**Domain-General Self-Concept**

**Hypothesis 1.7c: Relations between domain general self-concept, socio-economic variables, and student achievement.** There will be significant relations between the socio-economic variables, academic self-concept, and domain general student achievement as indicated by structural equation modelling. Specifically, academic self-concept will be positively related to the socioeconomic variables and domain general student achievement.

**Hypothesis 1.8c: Relations between academic self-concept, socio-economic variables, and student effort.** There will be significant relations between the socio-economic variables, academic self-concept, and domain general student effort as indicated by structural equation modelling. Specifically,
academic self-concept will be positively related to the socioeconomic variables and domain general student effort.

**Self-Regulation**

**Hypothesis 1.9: Relations between self-regulation, socio-economic variables, and student achievement.** It is hypothesised that there will be significant relations between the socio-economic variables, self-regulation, and student achievement as indicated by structural equation modelling. Specifically, it is expected that the elaboration, organisation, planning, monitoring, and regulating factors will be positively related to student achievement outcomes, whilst the rehearsal factor will be negatively related to achievement.

**Hypothesis 1.10: Relations between self-regulation, socio-economic variables, and student effort.** In line with Hypothesis 1.9, it is expected that there will be significant relations between the socio-economic variables, self-regulation, and student achievement as indicated by structural equation modelling. Specifically, it is expected that the elaboration, organisation, planning, monitoring, and regulating factors will be positively related to student achievement outcomes, whilst the rehearsal factor will be negatively related to achievement.

**Future Goal Orientation Differences in Path Relations across Gender, Grade, and Region**

**Research question 2.1: Path relations of future goal orientations and achievement across gender.** How are the future goal achievement model paths similar or different across gender?
Research question 2.2: Path relations of future goal orientations and achievement across grade. How are the future goal achievement model paths similar or different across grade?

Research question 2.3: Path relations of future goal orientations and achievement across region. How are the future goal achievement model paths similar or different across region?

Research question 2.4: Path relations of future goal orientations and effort across gender. How are the future goal effort model paths similar or different across gender?

Research question 2.5: Path relations of future goal orientations and effort across grade. How are the future goal effort model paths similar or different across grade?

Research question 2.6: Path relations of future goal orientations and effort across region. How are the future goal effort model paths similar or different across region?

Perceived Instrumental Value Differences in Path Relations across Gender, Grade, and Region

Research question 2.7: Path relations of perceived instrumental value and achievement across gender. How are the perceived instrumental value achievement model paths similar or different across gender?

Research question 2.8: Path relations of perceived instrumental value and achievement across grade. How are the perceived instrumental value achievement model paths similar or different across grade?
Research question 2.9: Path relations of perceived instrumental value and achievement across region. How are the perceived instrumental value achievement model paths similar or different across region?

Research question 2.10: Path relations of perceived instrumental value and effort across gender. How are the perceived instrumental value effort model paths similar or different across gender?

Research question 2.11: Path relations of perceived instrumental value and effort across grade. How are the perceived instrumental value effort model paths similar or different across grade?

Research question 2.12: Path relations of perceived instrumental value and effort across region. How are the perceived instrumental value effort model paths similar or different across region?

Motivation Differences in Path Relations across Gender, Grade, and Region

Research question 2.13: Path relations of motivation achievement models across region. How are the motivation achievement model paths similar or different across gender?

Research question 2.14: Path relations of motivation achievement models across grade. How are the motivation achievement model paths similar or different across grade?

Research question 2.15: Path relations of motivation achievement models across region. How are the motivation achievement model paths similar or different across region?
Research question 2.16: Path relations of motivation effort models across gender. How are the motivation effort model paths similar or different across gender?

Research question 2.17: Path relations of motivation effort models across grade. How are the motivation effort model paths similar or different across grade?

Research question 2.18: Path relations of motivation effort models across region. How are the motivation effort model paths similar or different across region?

Self-Concept Differences in Path Relations across Gender, Grade, and Region

Research question 2.19: Path relations of self-concept achievement models across gender. How are the self-concept (domain specific and domain general) achievement model paths similar or different across gender?

Research question 2.20: Path relations of self-concept achievement models across grade. How are the self-concept (domain specific and domain general) achievement model paths similar or different across grade?

Research question 2.21: Path relations of self-concept achievement models across region. How are the self-concept (domain specific and domain general) achievement model paths similar or different across region?

Research question 2.22: Path relations of self-concept effort models across gender. How are the self-concept (domain specific and domain general) effort model paths similar or different across gender?
Research question 2.23: Path relations of self-concept effort models across grade. How are the self-concept (domain specific and domain general) effort model paths similar or different across grade?

Research question 2.24: Path relations of self-concept effort models across region. How are the self-concept (domain specific and domain general) effort model paths similar or different across region?

Self-Regulation Differences in Path Relations across Gender, Grade, and Region

Research question 2.25: Path relations of self-regulation achievement models across gender. How are the self-regulation achievement model paths similar or different across gender?

Research question 2.26: Path relations of self-regulation achievement models across grade. How are the self-regulation achievement model paths similar or different across grade?

Research question 2.27: Path relations of self-regulation achievement models across region. How are the self-regulation achievement model paths similar or different across region?

Research question 2.28: Path relations of self-regulation effort models across gender. How are the self-regulation effort model paths similar or different across gender?

Research question 2.29: Path relations of self-regulation effort models across grade. How are the self-regulation effort model paths similar or different across grade?
**Research question 2.30: Path relations of self-regulation effort models across region.** How are the self-regulation effort model paths similar or different across region?

**Interaction between Future Goal Orientation and Perceived Instrumental Value**

**Research question 3.1: Interaction of future goal orientation and perceived instrumental value in predicting outcomes measures.** Is there a significant interaction effect between future goal orientation and perceived instrumental value in predicting achievement and effort outcome measures and if so what is the nature of this interaction?

**McInerney’s Revised Model of Student Outcomes: Relations Between Socio-economic, Psychological, and Outcome Variables**

**Research question 4.1: Relations between psycho-social variables and achievement.** What are the correlations between the socio-economic variables (socio-economic status and parent education), the psychological variables (future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation), and student achievement as indicated by confirmatory factor analysis?

**Research question 4.2: Relations between psycho-social variables and effort.** What are the correlations between the socio-economic variables (socio-economic status and parent education), the psychological variables (future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation), and student effort as indicated by confirmatory factor analysis?
**Research question 4.3: Goodness-of-fit of McInerney’s Revised Model of Student Achievement.** Does McInerney’s revised model of student achievement demonstrate an adequate fit with the PNG data as demonstrated through structural equation modelling?

**Research question 4.4: Paths between psycho-social variables and achievement.** What are the predictive relations between the socio-economic variables, the psychological variables, and student achievement as displayed in Figure 4.6?

**Research question 4.5: Goodness-of-fit of McInerney’s Revised Model of Student Effort.** Does McInerney’s revised model of student effort demonstrate an adequate fit with the PNG data as demonstrated through structural equation modelling?

**Figure 4.6. Paths between psycho-social variables and student outcomes**

*Note.* SES = socioeconomic status variables; FG/IV = future goal orientation / perceived instrumental value variables; MOT = motivation variables; SR = self-regulation variables; SC = self-concept variables; OUT = achievement and effort outcome variables

**Research question 4.6: Paths between psycho-social variables and effort.** What are the predictive relations between the socio-economic variables, the psychological variables, and student effort?
Rationale for Research Questions for Study 2

Due to the unique nature of this study in examining these constructs in a PNG context, a combination of hypotheses and research questions were put forth to explore the relations examined in Study 2. The present investigation will contribute a rare study to the literature as it is one of few studies attempting to: (a) identify the key psycho-social variables influencing educational outcomes within PNG – an Indigenous, developing country, comprising a majority population; and (b) examine such a large range of psychological variables and their influence on student outcomes within the same model (see Chapter 3 for a detailed explanation of this). McInerney’s revised model of student achievement is unique in that it examines a large range of both socio-economic and psychological variables and their influence on student achievement and effort simultaneously. It is also unique in that it attempts to predict a direction of influence between the variables. Hypotheses and Research Questions proposed in Study 2 were based on the literature described in Chapter 3 that forms the basis of McInerney’s revised model of student achievement.

Rationale for Research Questions: Future Goal Orientation and Perceived Instrumental Value

A body of research, conducted in both Western and some cross-cultural student settings, has supported the link between future goal orientation and perceived instrumental value of schooling tasks (Phalet et al., 2004). Some studies have found that students with high employment and career oriented future goals have been shown to persist more and achieve positive student outcomes (Peterson & Delmas, 2001). In the current study, these two future goals fall under
the category of success future orientations. In addition to this, students’ perceptions of the relevance of coursework and school tasks have been found to be associated with increased motivation to study and academic outcomes (Frymier & Shulman, 1995). Furthering this relation, research has suggested that an interaction exists between future goal orientation and perceived instrumental value, and that this interaction significantly predicts both academic motivation and achievement outcomes (De Volder & Lens, 1982). This research suggests that high future goal orientation in combination with high instrumental value is often associated with positive student outcomes, whereas decreased future goal orientation, even in the presence of high instrumental value is related to low and/or negative student outcomes.

Therefore, the current study will investigate both the individual relations between future goals and perceived instrumentality and learning outcomes, and the effect of their interaction in influencing student outcomes. In addition to future goals and instrumental value, past research has also examined the influence of students’ immediate motivational goals in serving a role in student learning and achievement. Some of these key findings will be highlighted in the following section.

**Rationale for Research Questions and Hypotheses: Motivational Goal Orientation**

Mixed findings have been reported amongst Western, minority, and collectivist cultures, when examining the relations between academic and social goal orientations and student achievement outcomes. Typically mastery, task, and effort goal orientations have been found to positively influence student
outcomes; however there are more discrepancies in the literature pertaining to performance and social goal orientations and their association with student outcomes (Covington, 2000; Schunk, 1996; Wentzel, 1996). On some occasions performance goals have been found to be negatively related to outcome measures and on others they have been positively related. Social goals have been suggested to serve an important role in positively predicting achievement particularly in non-Western settings, however, even these goals have been shown to have differential effects on achievement. For example, as discussed in Chapter 3, whilst social concern goals have been found to have a positive influence on outcomes, social affiliation and peer interaction goals have been found in some instance to be detrimental to the learning process.

Research in PNG has found a positive relation between social goals and outcome measures, however, this research is preliminary and the underlying relations are still unclear (Nelson et al., 2004). Some literature has even cited an interaction occurring between academic and social goals, however, the mechanisms underlying this interaction are also still unclear (Wentzel, 1996).

The relations between mastery, performance, and social goals, and student outcomes will therefore be investigated in the current study. The next section outlines the rationale behind the setting of self-concept research questions.

**Rationale for Hypotheses: Self-Concept**

The relations between self-concept and student academic outcomes have received much attention in the literature and these relations have been studied extensively across a number of settings (Marsh & Craven, 2006). However, like
the other psychological variables, this body of research has not been extended to
the PNG context and only research questions can be presented. Self-concept has
been found to be positively linked with a number of psychological variables as
well as student achievement and effort. Importantly, research has suggested that
a domain-specific approach must be considered when examining the relations
between self-concept and outcome measures (Marsh, 1986, 1990). That is,
subject-specific or domain-specific measures of self-concept should be used to
measure subject-specific performance and effort (Marsh, 1990; Marsh & Craven,
2006). Therefore, the relations will be examined between self-concept and
outcome measures within both domain specific and domain general frameworks.

The final section outlines the rationale behind the self-regulation research
questions.

*Rationale for Hypotheses: Self-Regulation*

Literature and research on self-regulation and learning processes has
examined their relations with student outcomes. However, this literature has not
been extended to the PNG context and again hypotheses cannot be formed. Self-
regulatory processes and learning strategies have been positively linked with
academic achievement across a number of domains (Marsh et al., 2006) and
cognitive and meta-cognitive strategies and deep learning processes have all been
shown to be positively linked with student outcomes. Furthermore, some surface
learning processes have been negatively linked to student outcomes; however,
the research on surface processes is ambivalent. The current investigation will
examine the relations between the cognitive and metacognitive self-regulatory
processes being measured and student outcomes to determine which learning processes are important for PNG students.

**Section Summary**

This section has presented the aims, research questions, and their rationale for the second study of the current investigation. Since this research is the first of its kind in PNG in examining such a large number of psycho-social constructs simultaneously, research questions were proposed. The following section presents the aims and research questions for the third, qualitative study of the current investigation.

**Study 3: Qualitative Investigation of Future Goals, Perceived Instrumental Value, Motivation, Self-Concept, and Self-Regulation**

**The Problem**

In order to examine the key psychological variables of McInerney’s revised model of student achievement qualitatively, the following question was proposed. What are students, teachers, and parents understanding of future goals, the importance of school in reaching those goals, academic motivation, self-concept, and self-regulatory processes within a PNG context? In order to address this, the following aims were constructed.

**Aims**

The aims of Study 3 were to:

(a) Illuminate the key quantitative findings of Studies 1 and 2, by examining via qualitative research methods the nature of PNG
students’ future goals, instrumentality, motivation, self-concept, and self-regulation; and

(b) Identify additional themes emerging from student, teacher, and parent data that are highlighted as serving an important role in PNG students’ educational experiences.

It is important to note that the qualitative study is not intended to test the quantitative data and so no hypotheses will be proposed for Study 3. Rather the qualitative study is designed to:

(a) Illuminate the quantitative findings;

(b) Access findings that may not have been highlighted in the quantitative studies;

(c) Provide an enriched insight into constructs that underpin PNG students’ academic achievement and applied effort from a variety of sources, including students, teachers, and parents; and

(d) Ground the quantitative data in the context of students’ day to day academic lives.

Statement of the Research Questions for Study 3

Qualitative Investigation of the Psychological Variables

Research question 1.1: Future goal orientation. What are the substantive and most frequently occurring issues and themes that emerge from student, teacher, and parent qualitative data regarding future goal orientation?

Research question 1.2: Perceived instrumental value. What are the substantive and most frequently occurring issues and themes that emerge from
student, teacher, and parent qualitative data regarding perceived instrumental value of schooling?

**Research question 1.3: Motivational goal orientation.** What are the substantive and most frequently occurring issues and themes that emerge from student, teacher, and parent qualitative data regarding motivational goal orientation?

**Research question 1.4: Self-concept.** What are the substantive and most frequently occurring issues and themes that emerge from student, teacher, and parent qualitative data regarding self-concept?

**Research question 1.5: Self-regulation.** What are the substantive and most frequently occurring issues and themes that emerge from student, teacher, and parent qualitative data regarding self-regulation?

**Qualitative Investigation of Additional Educational Influences**

**Research question 2.1: Additional themes.** What additional themes, to those investigated in the quantitative studies, emerge from the student, teacher, and parent qualitative data?

**Research question 2.2: Comparison of findings from quantitative and qualitative analyses.** How do the themes identified in the qualitative analyses relate to the findings from the quantitative studies? Specifically, which issues are compatible with the quantitative results and which additional issues have been raised from the qualitative data?
Rationale for the Research Questions for Study 3

Due to the paucity of research that has been conducted in PNG, it was useful to employ a mixed-methods approach to enrich understandings of the issues under investigation. Qualitative analyses provide opportunities to highlight particular quantitative findings as well as providing potential explanations for their interpretation. They also provide opportunities for accessing information that may not have been included within the quantitative framework or that may not have been identified in the literature (see Chapter 5). For these reasons the abovementioned research questions were put forth to ensure that the qualitative data would aid understanding and interpretation of the quantitative findings and enrich the findings pertaining to future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation.

Summary

Education in PNG has yet to be investigated under systematic circumstances and within the parameters of a sound research design and a theoretically strong model of achievement. By working within such parameters and by combining quantitative and qualitative data collection and analysis techniques, it is possible to gain a more complete understanding of the nature of the psychological variables at work and their relations with student outcome measures in PNG. The current chapter presented the hypotheses, research questions, and their rationale for the investigation’s three studies. The purpose of Study 1 was to examine the psychometric properties and nature of the PNG students’ responses to the instrumentation, across gender, grade, and region. The purpose of Study 2 was to examine McInerney’s revised model of student
achievement within a PNG context by examining the relations between the socio-economic and psychological variables, and student academic outcome measures. Finally, the purpose of Study 3 was to support and further extend the quantitative findings with results from student, teacher, and parent qualitative data. The following chapter outlines the methods employed to address the hypotheses and research questions that have been presented in the current chapter.
CHAPTER FIVE

METHOD

Introduction

The current chapter outlines the methods that were employed to address the hypotheses and research questions that were introduced in the previous chapter. Three studies employing a synergistic combination of qualitative and quantitative methodologies were designed and powerful statistical techniques were applied to achieve a sound research design across all three studies. The sample demographics and participant characteristics are described along with the methods employed to approach participants in a culturally sensitive and relevant manner. All instrumentation utilised in the investigation are described and the procedures for examining the psychometric properties and analysing the data are detailed. Furthermore, some of the culturally specific practicalities of conducting research in the culturally and environmentally diverse country of PNG are discussed.

Overview of the Present Investigation

The investigation comprises three studies designed to address the hypotheses and research questions proposed in Chapter 4. Studies 1 and 2 were quantitative in nature and utilised a large student sample drawn from three different regions in PNG. Study 3 was qualitative in nature and data were drawn from student, teacher, and parent semi-structured interviews and open ended responses. The importance of adopting such a mixed-method approach in the current investigation will be explained in the following section.
Mixed Method Research

For a number of decades, and even in much current educational and psychological research, quantitative and qualitative methodologies have been viewed as competing and incompatible. Researchers involved in the quantitative-qualitative debate often attempt to hold one methodology as being superior to the other (Tashakkori & Teddlie, 2003) and they are often utilised and discussed as separate and distinct methodologies. However, although still rare, current trends in education and psychology research literature have shifted towards mixed-methods approaches to research in which quantitative and qualitative designs are simultaneously employed. This has stemmed out of pressure from the research field that the quantitative-qualitative dichotomy is no longer applicable, and that mixed-method designs result in richer and broader objective and subjective understandings of the topic under investigation.

Sechrest and Sidani (1995) argue that the two methodological approaches are in fact complementary and that modern, good science is “characterised by methodological pluralism” (p. 77). As such, characteristics of each methodology can ‘cancel out’ or complement any disadvantages that the methodologies hold when they stand alone (Brewer & Hunter, 1989). For example, whilst quantitative methods produce systematic and objective outcomes, qualitative methods can provide further and broader insights into the phenomena under investigation that are not measured within the specified quantitative framework. Therefore, it was deemed important and necessary in the current study to employ such a mixed-method design in order to fully elucidate the influences of educational achievement amongst the PNG students.
Due to the cross-cultural nature of the study, elements of an ethnographic approach were adopted in the overall research design in order to obtain a more complete understanding of the psycho-social influences of PNG student achievement. Ethnography involves the study of culture, utilising a combination of research methods and the collection of diverse forms of data (Massey, 1998; Muncey & McQuillan, 1996). Ethnographic techniques aim to give voice to the cultural processes at work in different communities by obtaining data from multiple perspectives (Hymes, 1996; Massey, 1998). In the case of the current study, these data were obtained from students, their parents, and their school teachers. Furthermore, according to Spindler and Spindler (1992), ethnographic research aims to discover cultural knowledge, how this knowledge is employed in social interaction, and the consequences of this employment.

These methods involve the ethnographer constructing a coherent story or ‘snapshot’ of the individuals or communities being studied. Such a story can only be constructed by combining the voiced experiences of the participants with the interpretations of the ethnographer. This idea was endorsed by Wilcox (1982) who said:

The goal of ethnography is to combine the view of an insider with that of an outsider to describe a social setting. The resulting description is expected to be deeper and fuller than that of the ordinary outsider, and broader and less culture-bound than that of the ordinary insider (p. 462).

Supporting this idea, more recently LeCompte and Preissle (1993) noted that the intention of ethnographic research should be to create as vivid a reconstruction as possible of the culture or groups being studied. They emphasise the processes
of description, induction, generation, construction, and subjectivities involved in qualitative ethnographies.

According to Massey (1998), partial enculturation is required by the ethnographer. That is, the ethnographer must involve themselves within the culture being studied for a period of time, but then remove themselves in order to interpret and understand the collected data. Such procedures and methods were employed in the current study in order to gain this more complete understanding of the PNG students under investigation. The researcher ensured that a level of enculturation occurred during the fulfilment of this research and substantial time was spent by the researcher being immersed in the urban, rural, and village research settings in PNG.

The following sections discuss the participants, research settings, instrumentation, and data analyses employed by the current mixed-method investigation. These will be discussed for the quantitative and qualitative studies separately where necessary.

Participants

Quantitative Study

Participants for the two quantitative studies were made up of the student sample only. Student participants consisted of nine-hundred and seventeen school students, who came from a combination of urban, rural, and village schools across PNG. Students also came from a combination of primary and secondary grades and their age ranged from 9 to 28 years old with a mean age of 17. The sample comprised 520 males (age $M=17.43$, $SD=3.98$) and 395 females.
(age $M=16.59$, $SD=2.47$). The number of students are presented separately for urban, rural, and village regions in Table 5.1.

Table 5.1. Student Gender and Grade Demographics across Urban, Rural, and Village Regions

<table>
<thead>
<tr>
<th>Gender</th>
<th>Grade</th>
<th>Participants</th>
<th>Male</th>
<th>Female</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Total</td>
<td>325</td>
<td>173</td>
<td>152</td>
<td>115</td>
<td>207</td>
</tr>
<tr>
<td>Rural</td>
<td>448</td>
<td>276</td>
<td>171</td>
<td></td>
<td>1</td>
<td>442</td>
</tr>
<tr>
<td>Village</td>
<td>140</td>
<td>67</td>
<td>72</td>
<td></td>
<td>128</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note.* Some gender, grade, and region data were missing, resulting in unequal total cells

As can be seen from Table 5.1, almost the entire rural sample comprised secondary students and the entire village sample was made up of primary students. In PNG, people living in village regions rarely have direct access to secondary schools and often have to send their children away to board to gain their secondary education. It tends to only be urban regions that have access to both primary and secondary schools. Therefore, due to these unequal cell sizes, caution must be adopted when interpreting the results pertaining to grade and regional differences. For the rural sample, findings may be attributed to the fact that the sample comprises only secondary students. Similarly, for the village sample, findings may be due to the main composition of the sample being primary aged students.

It is also interesting to note the large age range in the student sample. Many students in PNG struggle to access education due to financial difficulties.
This often results in them not being in a financial position to enrol in school at an ‘age-appropriate’ time and having to postpone their education. Many young adults, once they have established themselves to be more financially secure, enrol in school at a later stage in their lives. Often, these young adults will still choose to enrol in schools in which their younger peers are attending, and therefore the age range is often wide and varies between schools and regions. It is not unusual in PNG to come across young adults in their mid twenties, enrolled in Grade 4 at the local village primary school. Furthermore, these financial difficulties can often result in families waiting longer to enrol their children in school so that when they are in senior high school and of an age to begin work they can help support their own school fees.

**Qualitative Study**

The qualitative study consisted of a combination of student, teacher, and parent samples. The first type of qualitative data that was collected was via semi-structured interviews. (The design and purpose of these interviews will be discussed in greater detail later). Fifty-two semi-structured interviews were conducted in total. This sample involved thirty-two students, eleven teachers, and nine parents. These samples were also drawn from urban, rural, and village regions across PNG.

Secondly, a student sample was invited to answer a series of open-ended questions that were included at the end of the quantitative questionnaire, so that students could convey thoughts in their own words about some of the variables of interest in the study. A total of nine-hundred and seventeen students
completed eight open-ended questions concerning specifically targeted interest areas. These students were identical to the sample used in Studies 1 and 2.

The next section describes the regions from which the quantitative and qualitative samples were selected.

**Research Settings**

*Urban Schools*

One large urban school was invited to participate in the research, located in PNG’s capital city, Port Moresby. This school is a co-educational, non-government school that caters to students from Grade 1 to 12. The school receives no government funding, and students’ parents are required to pay school fees. The school is relatively well resourced and the teacher to student ratio is approximately one to thirty-five. Students begin school at 8am and finish at 3pm, and teachers follow the curriculum set by the Department of Education. The subjects predominantly taught include mathematics, English, science, social science, technology, arts, languages other than English, and physical education, health, and personal development. Students are also offered a range of electives such as information technology and home economics.

All subjects at the school are taught in English (the official language of instruction in PNG) and the school has a total ban on the use of *Tok Pisin* (Pidgin English) in school. The school services students from a large number of urban communities as well as a small number of village and rural communities and a small number of international students. The average socio-economic status of students enrolled in this school was higher than students from rural and village schools (see later analyses).
Rural Schools

Two large rural schools were also invited to participate in the current investigation. These two rural regions are located in two different provinces in PNG – the Oro and Central provinces. The first rural region is located along the North Coast of PNG and the second is located to the north of the city of Port Moresby.

The two schools participating in the study are National High Schools and range from Grades 9 to 12. These schools teach a similar core curriculum to the urban school; however, due to limited resources, are not able to offer certain electives such as information technology and home economics. The school’s infrastructure continually deteriorates and teacher to student ratios are higher than at the urban school. The schools are both day and night boarding schools, in which students (whose families can afford it) live and study on campus. Students who do not live on campus will often travel by foot, public motor vehicles, or obtain travel assistance to school from friends or relatives.

The average socio-economic status of students at this school is lower than urban schools but higher than village schools. Students who are enrolled in these schools had to complete and pass a secondary school entrance exam. Therefore, their current enrolment is based on a minimum prior achievement level.

Village Schools

A total of five village schools were also invited to participate in the research. These five schools service twelve different villages that make up the infamous Kokoda Track. These twelve villages are found in the Central and Oro Provinces of PNG and extend across the Owen Stanley Range, famous for the
World War II battles between Australian and Japanese soldiers and the dedicated assistance from the Papua New Guinean carriers – the Fuzzy Wuzzy Angels. Many of the students in these schools are descendents of those who witnessed the devastating events of the war, and artefacts, memories, and scars of the war are evident still today in many of the communities.

The villages are particularly remote and secluded and are predominantly accessible by foot. They are self-sufficient with their main source of food coming from within the village, and all the village members contribute to maintaining each other’s lifestyle. The schools have teachers who also reside in the village or in the teacher’s quarters at the school.

Village schools are often under-resourced and are in dire need of maintenance, updated resources, and additional facilities. Furthermore, they often have short change-over periods of staff members and teacher to student ratios are extremely high. Some of the smaller village schools only offer a certain number of grade levels in any one year, according to the need in the village and a simultaneous progression by all students. Hence, a particular school grade level may have a very wide age range. Further implications of such a structure are that teachers must be able to teach a wide range of subject matter at a number of different grade levels.

The village schools are also predominantly taught in English (from Grade 3 onwards). Teachers from the village schools, however, reported utilising *Tok Pisin* (Pidgin) to a greater extent than urban teachers did, in order to assist them in overcoming language barriers. The northern villages along the Kokoda Track predominantly speak the *Biaga* dialect, whilst the southern villages speak a *Kioari* dialect. In addition to these past research by Nelson et al. (2004) found
that a phenomenal twenty-four dialects were reported by students from two of the schools along the Kokoda Track. Therefore, other than the official language of education, English, teachers from the village schools often attempt to find another common language to assist with their instruction.

Village students reported that their socio-economic status was lower than students from both urban and village schools. Socio-economic status (SES) was calculated according to a self-report measure given by the students. The SES measure was based on the SES measure used in the Organization for Economic Cooperation and Development (OECD) Program for International Student Assessment (PISA) Database (2003, 2005). This research developed an SES measure based on students’ family wealth levels which were measured by the existence of household items. This SES measure was adapted for the current study to be appropriate for use in PNG and included data on the PNG students’ access to basic resources, the ratio of rooms to people living in their home, and their access to water supplies, food, and technology.

In addition to an SES measure, the current study also included a parental education (PE) measure. This was also based on the methodology of the OECD PISA (2003, 2005) study and indices of parental education were constructed by recoding educational qualifications into the following categories: (1) None; (2) Elementary; (3) Lower Primary; (4) Upper Primary; (5) High School; and (6) University. Indices with these categories were provided for both the students’ mother (or female guardian) and father (or male guardian).

Both the SES and PE indices have been shown to be valid and reliable measures of socio-economic status and parent education across a wide range of
countries worldwide. In the current study, these variables were correlated significantly at .49 (p<.01).

The means and standard deviations of socio-economic status scores across the three regions in PNG are displayed in Table 5.2. A one-way ANOVA was conducted to determine if there were significant differences between the groups on socio-economic status. This analysis found that there were significant differences between all three groups, $F(2, 772) = 37.02, p<.001$.

The next section discusses the importance of, and the process involved in, conducting culturally sensitive research, and examines some of the specific practicalities of conducting research in PNG.

Table 5.2. *Socio-economic Status of Students across Urban, Rural, and Village Regions in PNG*

<table>
<thead>
<tr>
<th>Region</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>7.81</td>
<td>1.95</td>
</tr>
<tr>
<td>Rural</td>
<td>6.91</td>
<td>1.77</td>
</tr>
<tr>
<td>Village</td>
<td>6.08</td>
<td>1.68</td>
</tr>
</tbody>
</table>

*Note. Socio-economic status scores could range from a minimum of 0 to a maximum of 10.*

**Culturally Sensitive Research**

Research in all cross-cultural settings must proceed with utmost attention to integrity, respect, and responsibility in order to build relations with the participating individuals and communities and to ensure the integrity of the
research findings. Attention to and respect for local PNG languages and customs was vital so as to ensure all participants understood the purpose of the research and what would be expected of them. Such a process was also important so that the study’s findings would be interpreted meaningfully.

Initial permission was obtained from the Research Committee of the PNG Department of Education and the Human Ethics Committee from the University of Western Sydney. Principals from the eight urban and village schools were then invited to participate by letter (see Appendix A) and were informed of the purpose of the research, what would be expected of participants, and the intended benefits and implications of the findings. Parents and/or guardians were also invited to consent to their child participating in the study by letter (see Appendix B). The information sheets that were provided to parents were translated into their local dialect (see Appendix C for an example). Students with parental and/or guardian permission to participate were informed verbally and in writing (on the questionnaire) of the purposes of the study and advised that their participation was voluntary and anonymous. Details of the purpose of the study were given to both the parents and the students completing the questionnaire, and they were made aware of the research implications, use of the findings, and assured of access to the findings on completion.

The researcher personally attended all eight schools and administered the questionnaires and conducted the qualitative interviews with the student, teacher, and parent participants. The researcher also visited the villages and communities of the participating schools, developed rapport with the community members, and learnt about and experienced local customs.
Based on a study by Barker, McInerney, and Dowson (2002), the questionnaire was read aloud by the researcher to emulate previous administration techniques. This verbal administration procedure ensured that: (a) participants completed the survey within the allocated time; (b) reading difficulties were avoided; and (c) administration procedures were consistent across participating schools. In each class, an extra instrument administrator was present to assist individually any students experiencing difficulties completing the questionnaire. The questionnaire was administered over a period of approximately fifty minutes.

A mediator and a translator also participated in the administration of the questionnaire to assist with cultural and language barriers. The mediator was a village elder and the translator was the school teacher, both of whom were briefed on the intentions and purposes of the research and ensured that participants understood that their participation was not compulsory.

Students participating in qualitative interviews were initially approached by a mediator who explained the purpose of the interview and that participation was not compulsory. Students from the village and rural schools then also had the translator and mediator assist with the interview; however, students from the urban schools did not require this assistance.

There were many obstacles faced by the researcher in the data collection process that were specific to PNG. The rough terrain in the village and rural communities meant that the research team had to access remote regions via foot or light aircraft. Entry via foot meant trekking the one-hundred kilometre long Kokoda Track – an extreme, arduous, and physically demanding expedition. The researcher spent a number of months in PNG immersing herself in the local
cultures and building rapport with various villages. Various physical obstacles included the PNG torrential wet season, extreme physical exertion upon the research team, and the lack of research resources within the participating schools such as stationary, desks, and administration rooms. Many of these obstacles were overcome with prior preparation, but the research conditions meant that the data collection process had to be flexible and open to change. On one occasion a village school in a remote jungle region that had been invited to participate could not be reached due to the wet season which resulted in the cessation of air transport and a marked increase in the size and flow of rivers preventing access via foot. On another occasion, a participating rural school, one week before data collection, had their administration building vandalised and destroyed by fire resulting in the loss of a number of student school records. These schools were therefore removed from the study.

In summary, this PNG based investigation was flexible and open to change and influence from external sources. However, as outlined above, many measures were employed to enhance the systematic and rigorous nature of the data collection process and to ensure that data collection was as consistent as possible across different schools and regions.

The next section describes the instrumentation that was used to address the research questions and hypotheses.

**Materials and Instrumentation**

**Quantitative Study**

Students completed a one-hundred and forty-seven item questionnaire that was designed to measure a range of factors that have previously been shown
to contribute to student achievement and engagement and that are conceptualised within McInerney’s revised model of student achievement (see Chapter 3). The factors measured by the questionnaire included students’ future goal orientation, perceived view of the instrumentality of education, achievement motivational goals, self-concept, and self-regulatory processes. These factors were measured by a combination of scales from the Future Goals Questionnaire-PNG (FGQ-PNG), the Inventory of School Motivation (ISM), the Academic Self-Description Questionnaire – Short version (SDQII-S), and the Goal Orientation and Learning Strategies Survey (GOALS-S). These instruments are discussed in further detail in the following sections and all items are displayed in Appendix D.

**Inventory of School Motivation**

The Inventory of School Motivation (ISM) was initially developed to reflect the dimensions of Maehr’s (1984) Personal Investment Model and in particular to investigate the nature of student motivation in cross-cultural settings (McInerney, 1992; McInerney & Sinclair, 1991; McInerney et al., 1997). This model proposes that several goals serve as a cause of motivated action, and it provides a useful framework in which achievement goals are conceptualised as being multidimensional and hierarchical. The framework is consistent with McInerney’s multidimensional, hierarchical model of motivation that was discussed in Chapter 3. The ISM defines eight first-order factors, and three higher-order factors. The three higher-order factors consist of mastery, performance, and social motivational orientations. Mastery orientation is defined by two first-order factors: task and effort. Performance orientation is defined by four first-order factors: praise, token, competition, and social power. Finally,
social orientation is defined by two first-order factors: affiliation and social concern.

All thirty-four items of the ISM are measured on a five-point Likert scale (ranging from 1 = Strongly Disagree to 5 = Strongly Agree). Thus, participant responses are coded so that higher scores reflect stronger endorsement of high levels of motivation. The eight first-order scales are described in further detail below.

Mastery orientation is measured by two ISM scales – task and effort. The task scale measures students’ interest in schoolwork, and the emphasis they put on learning for learning’s sake. This scale is measured by four items such as “I try harder with interesting work”. The effort scale measures the effort that students put forth in order to learn something new or to improve in their schoolwork. This scale is measured by five items including “When I am improving in my school work I try even harder”.

Performance orientation is measured by four ISM scales: praise, token, competition, and social power. The praise scale measures the importance of receiving verbal recognition and praise from others and is measured by five items including, “I want to be praised for my good schoolwork”. The token scale measures the importance of receiving token, tangible rewards for achievement and is measured by four items such as “Getting a reward for my good schoolwork is important to me”. The competition scale measures students’ competitive efforts via pathways such as self-reliance, individual striving, and surpassing others (McInerney, 1995). This scale is measured by four items including “I want to do well at school to be better than my classmates”. The final performance scale, social power, measures a student’s need to function in a
position of power, authority, or leadership. This scale consisted of four items such as “It is very important for me to be a group leader”.

Finally, social orientation is measured by two ISM scales – affiliation and social concern. The affiliation subscale measures the importance a student places on working with others or in groups. It is measured by three items including “I do my best work at school when I am working with others.” The social concern scale measures the concern that a student has for the welfare and achievement of their peers. It constitutes five items and includes the item “I like to help other students do well at school”.

The ISM has been used in a variety of cross-cultural settings and has demonstrated acceptable reliability and validity. McInerney et al. (2001) found that the eight subscales of the ISM demonstrated good reliability estimates and a strong factorial structure. They found that all eight scales were applicable to students from differing cross-cultural backgrounds (e.g., Navajo Indian and Anglo groups); however some groups may interpret the importance of the factors differently. Hence, caution was taken when making cross-cultural comparisons amongst all eight factors. Other studies have confirmed the factor structure of the ISM and the strong psychometric properties of the instrument. McInerney and Ali (2006) found the ISM to be a reliable instrument across seven cultural groups with Cronbach’s alphas ranging from .66 to .82.

The ISM instrument will be utilised in the current study for a PNG sample and both the factor structure and perceived importance of the eight scales will be examined. Furthermore, factorial invariance will be examined across gender, grade, and regional groups to determine whether meaningful cross-group comparisons can be made.
Future Goals Questionnaire-PNG

The Future Goals Questionnaire-Papua New Guinea version (FGQ-PNG) was revised from Brickman, Miller, and Roedel’s (1997) Future Goals Questionnaire (FGQ) to be appropriate for use in PNG. Brickman et al. originally developed the FGQ to measure two factors: (a) students’ perceived personal importance of various future goals; and (b) the strength of the perceived instrumental relation between engaging in academic activities and the attainment of the future goal. Therefore, the FGQ measures both future goals and the perceived instrumental value of school in helping students reach their goals.

Brickman et al. initially selected nine future goals that students may advocate and one academic situation for which instrumentality could be measured. The nine future goals were graduating from high school, going to a two-year college or vocational school, going to a four year college, getting a job after high school, making money, joining the military, having a family, gaining social status, and making a contribution to society, and the academic situation was doing well in maths class.

The FGQ-PNG was adapted from the original FGQ and targeted sixteen future goals. These included graduating from high school, attending a university, getting a job, making money, getting into the armed forces or police, supporting their family, making a contribution to their village or community, becoming an important person in their village, becoming a village elder, becoming a doctor in their village, one day leaving their village, finding work in Port Moresby, looking after their parents and siblings, becoming a successful person, becoming a politician, and knowing how to help their village make money. These items
were based on past qualitative studies (Nelson, McInerney, & Craven, 2005) and
ad hoc investigations conducted in PNG. Furthermore, each of the sixteen future
goals was investigated within the context of three academic situations in order to
examine the perceived instrumental value of a school task in achieving a future
goal. These three situations included attending school, getting good grades, and
completing assigned work. An example item included “Getting good grades in
school is important to making a contribution to society”. In total, the FGQ-PNG
comprised sixty-four items, measured on a 5-point Likert scale ranging from
‘strongly disagree’ to ‘strongly agree’.

Preliminary exploratory analyses were conducted on the FGQ-PNG via
an exploratory factor analysis (see Nelson et al., 2006). It was found that the
future goal items formed three future goal higher-order factors. These were
success, authority, and village future orientations. The success goals included
those goals directly related to become successful or to achieving a successful
milestone in life, such as graduating from high school or getting a job. Six items
formed this subscale. The authority goal subscale consisted of three future goals
which were about achieving a specific status or occupation level. Finally, four
items formed the village subscale and these items measured students’ future
village, family, and community orientations. Three items were not included in
these preliminary analyses due to cross loading. Therefore thirteen items were
used in the final analyses to measure the three success, authority, and village
factors of student future goal orientation.

The corresponding perceived instrumental value items were used to form
the three matching success, authority, and village instrumentality factors. As
stated earlier, for every future goal there were three corresponding perceived
instrumental value items (getting good grades, completing assigned work, and attending school). The average of these three items was calculated for each of the thirteen future goal items, in order to result in thirteen corresponding perceived instrumental value items. This process resulted in six success, three authority, and four village perceived instrumental value items.

Therefore, fifty-two items were used in the final FGQ-PNG analyses, measuring three future goal scales and three perceived instrumental value scales.

**Self-Description Questionnaire II-Short**

Items were also included in the questionnaire that measured students’ academic self-concept. These items were drawn from the academic scales of the Self-Description Questionnaire – Short version (SDQII-S; Ellis, Marsh, & Richards, 2002, 2005; Marsh, 1990) which measures general academic, mathematics, and English self-concept. The mathematics and English subscales consist of four and five items respectively and include items such as “I have always done well in mathematics” and “English is one of my best subjects”. The general academic scale consists of four items including, “I am good at most school subjects”. The items are measured on a five-point Likert scale ranging from ‘False’ to ‘True’ and the scales have demonstrated good reliability estimates across a number of different cross-cultural and educational settings (Bodkin-Andrews, Craven, & Marsh, 2005; Craven & Marsh, 2004; Ellis et al., 2002, 2005; Marsh, 1992).
**Goal Orientation and Learning Strategies Survey**

The Goal Orientation and Learning Strategies Survey (GOALS-S) was used to measure the cognitive and metacognitive learning strategies that students employ in their learning (Dowson & McInerney, 2004). Cognitive strategies were measured by three subscales: elaboration, organisation, and rehearsal. The elaboration subscale was measured by six items which measure the extent to which students make connections between present and previously learned information. An example elaboration item is “I try to understand how what I learn in school is related to other things I know”. The organisation subscale was measured by six items which refer to the selection, sequencing, and summarising of important information, for example, “I reorganise my schoolwork so that I can understand it better”. The rehearsal subscale was also measured by six items and targets behaviours such as listing, memorising, and reciting information to aid learning. An example item is “I repeat things to myself when learning things for school.”

Metacognitive strategies were also measured by three subscales: planning, monitoring, and regulating. Planning was measured by six items which measure prioritising, time-management, scheduling, and goal-setting. An example item is “I often try to decide first what are the most important parts of what I have to learn for school”. Monitoring involves self-checking for understanding, self-testing, and organising reviews of learned material, and was measured by six items such as “I often ask myself questions to see if I understand what I am learning”. It also involves using oneself as a resource for increasing understanding and trying to solve problems. The final subscale, regulating, was measured by six items such as “If I am having trouble learning something at
school, I ask for help.” Such items target the strategies that someone adopts to rectify any deficits they identify. Such strategies often include seeking explanations from other people such as one’s teacher, seeking different ways to learn material, and identifying mistakes in reasoning.

All thirty-six items were measured on a five-point Likert scale ranging from ‘strongly disagree’ to ‘strongly agree’. The GOALS-S has demonstrated good reliability with reliability estimates for the six subscales ranging from .72 to .92 (Dowson, 2004).

**Student Achievement and Effort Outcomes**

In addition to the instrumentation that measured psychological influences on student outcomes, a standardised achievement test was administered to measure achievement and effort. Students were administered the spelling and mathematics sections of the Wide Range Achievement Test – 3 (WRAT-3, Wilkinson, 1993). This resulted in students each gaining an English and mathematics achievement score, based on their performance on the test, as well as English and mathematics effort scores, based on how many items they attempted. Achievement scores were calculated by summing the number of correct responses given by students. Alternatively, effort scores were calculated according to the number of attempts the student made across the items, regardless of whether they achieved the correct answer. The correlations between the achievement and effort scores are displayed in Table 5.3.
Table 5.3. Correlations between English and Mathematics Achievement and Effort Scores

<table>
<thead>
<tr>
<th></th>
<th>ENG_ACH</th>
<th>MAT_ACH</th>
<th>ENG_EFF</th>
<th>MAT_EFF</th>
</tr>
</thead>
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<td>MAT_ACH</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>MAT_EFF</td>
<td>.27**</td>
<td>.71**</td>
<td>.08*</td>
<td>1</td>
</tr>
</tbody>
</table>

The spelling and mathematics sections of the WRAT-3 both consist of forty items each. For the spelling section, students are presented with a word and the context in which the word belongs and students are required to spell the word in written English. The difficulty of the words increases over the forty spelling items, and the test takes approximately fifteen minutes to complete. For the mathematics section, students are given fifteen minutes to complete as many of forty mathematical calculations as they can. They must do all calculations by hand (without a calculator of any kind), and like the spelling, the problems increase in difficulty across the forty items.

The WRAT-3 has been shown to be valid and reliable for use across a number of age groups (ages 5 to 75) and within different educational settings. Reliability estimates range from .85 to .95 across the two tests and the instrument’s content and construct validity have been confirmed across a number of studies (Wilkinson, 1993) Furthermore, norms have been established on a sample of four-thousand four-hundred and thirty-three participants and are provided on the basis of age-groups. These norms, however, were not based on a
developing country sample, and thus caution must be taken when interpreting these results. The two sections of the WRAT-3 take approximately thirty minutes to administer.

The WRAT-3 was deemed necessary in the current investigation due to the isolated geographical locations of the regions and the lack of standardised achievement measures used in the schools participating in the study. Schools in PNG tend to utilise a range of different tests and scoring systems for determining the achievement and effort levels of their students. For example, Nelson et al. (2004) found that the three primary schools used in their research all used different measures for determining the achievement of their students, ranging from percentiles, to achievement tests, to teacher ratings. Since the current study utilised a larger number of schools, spread across an even more geographically diverse region, it was deemed necessary to include the use of a standardised achievement test. Whilst it is acknowledged that there are some limitations associated with the use of the WRAT-3 in PNG (e.g., language difficulties, lack of norming on a developing country sample), the test was considered the only feasible option for determining PNG students’ achievement and effort scores. Such limitations, however, will be taken into account when interpreting and discussing the findings of the current research.

Finally, in addition to the quantitative scales and achievement tests, students were asked to provide certain demographic information. This information included their age, parents’ occupational and income status, school, grade level, and the language that they spoke at home. In addition to this, information was collected about students’ access to income and certain resources in order to gain a measure of socio-economic status.
This section has outlined the instrumentation that was administered to the student participants. The next section will outline a description of the statistical analyses that were performed on this data.

**Qualitative Study**

**Interview Schedules and Open-Ended Question Materials**

A combination of semi-structured interviews and open-ended questions were used to collect qualitative data concerning the psycho-social influences of PNG students’ learning experiences. First, semi-structured interviews were conducted with a combination of student, teacher, and parent participants. Semi-structured interviews utilise strategies so that the interview proceeds along similar lines to a conversation and covers several key target areas (see Bogdan & Biklen, 1992). This method allows enough flexibility for participants to freely highlight important and significant issues, but also so that key areas that are to be targeted by the research are also addressed in the interview. They also allow the interviewer to ask spontaneous questions resulting from information given by the interviewee during the interview. A total of fifty-two semi-structured interviews were conducted with students, teachers, and parents. Thirty-two students, eleven teachers, and nine parents were selected to be interviewed based upon advice given by the school principal (for urban and rural settings) or the village and community elders (for the village research settings). These participants were selected because they were considered by the principals and elders to be representative of the wider school and community population and because they were considered to be appropriate and well-spoken informants. Such representative students were selected in an attempt to increase the external
validity of the study. Caution should, however, be taken when generalising the results of the current investigation to students from other PNG communities and populations.

In addition to the semi-structured interviews, the nine-hundred and seventeen students examined in the quantitative studies also responded to eight open-ended qualitative questions. These questions were concerned with students’ future goal orientations and the perceived importance they placed on their current schooling experiences in helping them to reach their general, educational, and vocational-related goals (see Appendix E for a full listing of questions).

The following sections outline the data analyses utilised to analyse the quantitative and qualitative data collected via the afore-mentioned instrumentation and materials.

**Data Analyses**

**Quantitative Study**

*Statistical Software*

The data were initially entered and screened in SPSS v.12. All statistical analyses were performed in SPSS 12.0, PRELIS, and LISREL 8.72 (Joreskog & Sorbom, 2004).

*Data Screening*

Initial analyses involved screening data for missing values, univariate, and multivariate outliers, and checking for assumptions of normality, linearity, and homoscedasticity. Missing values were initially examined in order to determine if they were missing at random or systematically. Cases that displayed evidence of systematically missing data were deleted from the analysis via
listwise deletion. Approximately five percent of cases were removed from the analysis. Variables that contained randomly missing values were examined and the missing values were replaced using the Expectation Maximisation (EM) algorithm. This missing data replacement technique is a type of maximum likelihood estimation that provides replacement values that do not change the variance of the covariance matrix and predicts the missing value based on the relations between other cases that are not missing. The algorithm estimates the means, the covariance matrix, and the correlation of quantitative variables with missing values using an iterative process, and it represents the most practical, state-of-the-art procedure for the imputation of missing data (Schafer & Graham, 2002). These analyses were conducted using SPSS 12.0.

Univariate and multivariate outliers must also be identified and either modified or deleted from the analysis because they can have detrimental effects on the outcomes of following statistical analyses, especially those involved in structural equation modelling. Univariate outliers are identified initially by examining extreme scores on stem-and-leaf plots and histograms. When evidence of outliers is detected Tabachnick and Fidell (2001) recommend converting the raw scores to standard scores (z-scores). Z-scores greater than +/-3.29 are then considered to be outliers and need to be modified. Tabachnick and Fidell provide instructions for modifying univariate outliers and suggest converting the raw score for an outlier to be only one unit more extreme than the next most extreme score. Hence, the score is still an extreme score and exerts a similar influence as initially intended but it is no longer an outlier. Multivariate outliers, however, cannot be treated in the same way as univariate outliers. Multivariate outliers result because of an unusual relation between the independent and dependent
variables in an analysis or because of an unusual pattern of scores amongst the independent variables. These outliers can distort the outcomes of any statistical analyses and must be deleted from the analysis. Multivariate outliers are defined as observations that have a large Mahalanobis distance (squared) score, which is a distance measure that takes into account the covariance matrix (Filzmoser, 2004). Therefore, cases were identified that had extreme Mahalanobis distance scores, and thus were removed from the analysis. After the removal of non-missing at random data and multivariate outliers the sample size was reduced from nine-hundred and seventeen to eight-hundred and sixty-five.

The data were also screened for normality, linearity, and homoscedasticity by requesting histograms, scatterplots, and examining tests of normality. These assumptions were found to be met reasonably well in the data.

Statistical Analyses

The majority of analyses performed employed structural equation modelling (SEM) and confirmatory factor analyses (CFAs) which compare the goodness-of-fit between a sample covariance matrix and an a-priori hypothesised model. The specific analyses used in the quantitative investigation are outlined in the following sections.

Reliability Analyses. Reliability analyses were performed separately for the subscales of each of the quantitative instruments to determine the scale’s internal consistency for use with PNG students. The traditional method for measuring the internal consistency reliability of a scale is Cronbach’s alpha (Cronbach & Shavelson, 2004). This statistic is calculated by estimating the average intercorrelation between an item and a set of items drawn from the same
measure. Cronbach’s alphas range from 0 to 1, where 0 corresponds to complete unreliability and 1 means perfect reliability. There are no universally accepted views as to what constitutes an acceptable reliability estimate. Many suggest that Cronbach’s alpha estimates should ideally be above .70 (Hills, 2005), but other researchers believe that alphas above .60 are acceptable, particularly in exploratory research and in diverse cross-cultural settings (Nunnelly, 1978; Streiner & Norman, 2003). Others still comment on the fact that the Cronbach’s alpha is influenced by the number of items in a scale, and that the alpha statistic will always be lower for scales with smaller items (Streiner & Norman). Due to the fact that the current investigation is exploratory in nature, conducted in a unique and culturally diverse setting, and utilises scales with a small number of items Cronbach’s alphas of .60 were deemed acceptable but were interpreted with some caution.

**Confirmatory Factor Analyses.** In addition to the reliability of a scale it is important to validate the factor structure of all instrumentation when being used in a new cultural setting. Confirmatory Factor Analyses (CFAs) were therefore performed to examine the factor structure and validity of all instrumentation that was used to measure student future goals, perceived instrumental value, motivation, self-concept, and self-regulation. Five separate CFAs were initially performed on student data from the five scales to determine the goodness-of-fit of the hypothesised models. CFAs were performed using PRELIS and LISREL 8.72 (Joreskog & Sorbom, 2004) and were based upon covariance matrices.

CFAs test the extent to which indicator items reflect an *a-priori* underlying factor structure (Byrne, 2001). That is, the researcher postulates an *a-
priori model which outlines a set of relations between observed indicators (questionnaire items) and underlying, unobserved constructs known as latent variables (Byrne). CFAs allow the investigator to select both how many and which specific items are the indicators of these latent factors (Fleishman & Benson, 1987). In CFA, models represent the configuration of the factor loadings, factor variances/covariances, and unique errors in the measured variables. Models are typically depicted pictorially, and an example higher-order model is displayed in Figure 5.1. This model is reflective of the structure of the ISM to be tested in Chapter 6. As can be seen in this representation there are thirty-four observed indicator items depicted by the small rectangles. The effect of measurement error (uniquenesses) on each indicator item are represented by the small circles with an arrow pointing towards the indicator item.

The latent, or unobserved, variables are represented by the ellipses. For this model there are eight first-order latent variables (task, effort, competition, social power, token, praise, affiliation, and social concern) and three higher-order latent variables (mastery, performance, and concern). The effect of each latent variable on its indicator (or in the case of the higher-order variables, the effect on the first-order factor) is indicated by a straight line with a single arrowhead pointing away from the latent variable. The covariances among the latent variables are represented by curved lines with double-headed arrows. In the higher-order model depicted there are three factor covariances to be estimated. Each indicator item is hypothesised to load only on its respective factor and no correlations between the error terms are hypothesised.
Figure 5.1. Pictorial representation of structural model for the higher-order ISM

Note. Task = task motivation; Effort = effort motivation; Comp = competition motivation; Power = social power motivation; Praise = praise motivation; Token = token motivation; Affil = affiliation motivation; Conc = social concern motivation

Once a model is specified it is then necessary to evaluate how closely the *a-priori* model represents the actual relations found in the collected data. This process is called model-fitting. For the current investigation an iterative method known as maximum likelihood estimation was used to estimate the parameters in the model (Kaplan, 2000). This procedure is robust with respect to violations of normality that can potentially affect parameter estimates and goodness-of-fit indices (Hu, Bentler, & Kano, 1992; Joreskog & Sorbom, 1993; Muthen & Kaplan, 1985). One of the ways of judging the goodness-of-fit of a model with the observed data is through fit indices. Goodness-of-fit indices typically either: (a) assess the discrepancy between a model implied variance-covariance matrix and a sample variance-covariance matrix; or (b) compare the fit of a hypothesised model with a specified factor structure, to the data when compared to a model with no hypothesised factor structure (i.e., a uni-factor or “null” model). In accordance with recommendations by Holmes-Smith (in press), the following goodness-of-fit indices were emphasised in the current study: the Root
Mean-Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI). According to Holmes-Smith, a good to excellent fit is indicated by an RMSEA lower than .05 and a TLI and CFI greater than .95. However RMSEA values as high as .80 and TLI and CFI values as low as .90 also indicate acceptable fit indices (Browne & Cudeck, 1993; Marsh, Balla, & Hau, 1996). Furthermore, Marsh (in press) suggests that these cut-off values must be interpreted purely as guidelines to aid model acceptance and that professional subjectivity and judgement must also be used in the selection of the best model. In addition to these fit indices, the \( \chi^2 \) test statistic and degrees of freedom were calculated and reported.

Therefore, for Study 1, a CFA was conducted on each of the scales administered to the students and the results are presented in Chapter 6. After instruments were identified as being psychometrically sound, that is, valid and reliable, the next step was to perform factorial invariance tests on the models across each of the groups (gender, grade, and region) as a further test of the psychometric properties of instrumentation. The statistical methods for determining factorial invariance will be outlined in the next section.

**Factorial Invariance.** CFAs and reliability analyses allow the researcher to determine if the scales in their instrumentation are psychometrically sound for use with a particular sample. In addition, it is important to assess whether or not the model factor structure is consistent across sub-groups of interest within the sample. In the present investigation tests of factorial invariance (Joreskog & Sorbom, 1981; Marsh, 1994) were performed across gender, grade, and region in PNG. Tests of factorial invariance involve testing a set of hypotheses that examine various parameters in a model in a logically ordered and increasingly
restrictive fashion (Byrne, 2004). Invariance testing involves testing a succession of models where any one, or set of parameters, is held invariant (or equal) across groups. In the present investigation five models in total were examined for their goodness-of-fit indices across the various groups selected. That is, the models were examined across gender, grade, and region. The first model contained no invariance between the groups and was used as the baseline model. After this, selected parameters were held invariant across the groups in an increasingly more stringent manner. The second model (M2) held the factor loadings invariant across the groups. This is considered the minimum requirement for factorial invariance across groups (Cheung & Rensvold, 2002). Therefore, since this is the necessary condition for invariance, this model was considered the model of most importance. The third model (M3) held the factor loadings and factor covariances invariant, whilst the fourth model (M4) held the factor loadings and the uniquenesses invariant. The final model (M5) held all parameter estimates (i.e., factor loadings, factor covariances, and uniquenesses) invariant across the groups. The final two models, however, are often considered to be extremely restrictive tests of invariance (Byrne, 2001; Parker, Dowson, & McInerney, in press) and hence results should be interpreted with caution.

The extent to which the groups examined are invariant in the model factor structure is determined by examining the goodness-of-fit indices of the models. The baseline model, M1, is compared with the other four models, M2, M3, M4, and M5, and changes in the fit indices are examined. Emphasis is placed on the TLI, CFI, and RMSEA criteria. According to Cheung and Rensvold (2002) a change of no more than .01 in the fit indices is indicative of factorial invariance across the groups. Therefore, in the current study, in order for the minimum
requirement of factorial invariance to be met (factor loadings only; see Parker, Dowson, & McInerney, in press) the differences in goodness-of-fit indices between M1 and M2 must not exceed .01. These tests of invariance were conducted using LISREL 8.72 (Joreskog & Sorbom, 2004).

**Structural Equation Modelling.** Structural Equation Modelling (SEM) was also employed in the current investigation to examine the relations between a number of predictor variables and student outcome variables. SEM examines the causal relations between the latent factors that are generated through the CFAs. These relations are tested through multiple regression analyses and incorporate the structural relations between latent variables as well as observed variables (Byrne, 1994). These processes allow for the detection of associations between these variables by obtaining parameter estimates close to their population values and by isolating the variables via their uniquenesses and unreliability of their indicators (Hoyle, 1995). SEM is considered to be an extremely useful tool for examining the relations between latent and observed variables and hence was utilised in both Studies 1 and 2 in the current investigation.

**Multiple-Indicator-Multiple-Indicator-Cause-Models.** A Multiple-Indicator-Multiple-Indicator-Cause (MIMIC) Model refers to a specific application of SEM. A MIMIC model contains latent variables that are simultaneously identified by both observed indicator items and by exogenous causal variables. The observed indicator items include those items that compose the latent variable whilst the exogenous causal variables include gender, grade, and gender x grade interactions. These models simultaneously test the factor
structure of the measure and the effects of the exogenous variables on the latent factors (Kline, 2005).

The outcomes of the MIMIC models are evaluated with the same goodness-of-fit criteria that were used in the CFA and SEM analyses. Any significant paths identified between the exogenous variables (gender, grade, gender x grade) and the latent variable indicate a significant effect of that variable on the latent factor.

For the current study, MIMIC models were performed for each of the models examined with CFA. The exogenous variables included in each of the models were gender, grade, and the gender x grade interaction, and MIMIC analyses were conducted across regional groups in PNG. Any significant interactions were further analysed by examining interaction plots. All MIMIC analyses were conducted using LISREL 8.72.

In summary, this section has outlined the statistical procedures to be conducted in the two quantitative studies that comprise the present investigation. CFAs, reliability analyses, invariance testing, SEMs, and MIMIC models were all discussed and applied to the current research design. In addition to the two quantitative studies, the current investigation also included a third, qualitative study. The next section outlines the advantages of conducting mixed-method research, followed by a summary of the qualitative data analyses to be employed in this study.

Qualitative Study

Research Design

The current study implemented a qualitative component for three main purposes. The first was to enrich and extend findings from the quantitative
component of the present investigation concerning the key psycho-social
determinants of student academic outcomes. The second was to situate and
examine the psychological variables within the broader sociological, cultural,
and environmental influences of the cross-cultural setting. Finally, the qualitative
study aimed to elucidate multiple perspectives from multiple sources, that is,
from students, teachers, and parents, across multiple regions throughout PNG.
The qualitative research design was thus separated into two sections. The aim of
the first qualitative section was to illuminate the key quantitative findings
(presented in Chapters 6 and 7) and to examine student, teacher, and parent
qualitative data on the five psychological variables targeted in the quantitative
studies. An *a-priori* qualitative approach was employed to do this whereby the
data collected was analysed for pre-known content and themes.

The second component of the qualitative research aimed to unearth any
additional findings that were not targeted by the quantitative instrumentation. To
do this, a grounded theory approach was employed, whereby themes, ideas, and
eventually theory, are generated out of the data collected (Strauss & Corbin,
1990). This methodological approach was employed in order to gain more
complete understanding of the influences of PNG student education and to
ensure that key influences that were not targeted via the quantitative analyses
were addressed by the ensuing analyses.

**Procedures and Analyses**

The student, teacher, and parent semi-structured interviews were recorded
using a tape-recorder and microphone. The interviews lasted thirty minutes on
average and were often conducted in a one-on-one format, but in the presence of
other students or community members. All interviews were transcribed verbatim which permitted a detailed comparison between respondents’ accounts (Hammersley & Atkinson, 1995).

As indicated above, two main data collection techniques were utilised in the investigation – semi-structured interviews and open-ended questions. The data were analysed across both qualitative data collection techniques and across all sources from which the data were collected. Data from each source (e.g., students, teachers, and parents) were used to illuminate data from other sources and concurrent themes were examined across multiple sources (Hammersley & Atkinson, 1995).

Student responses to the open-ended questions were coded by two researchers. Five percent of the student answers to the questions were examined initially and the emergent themes were established. Inter-rater reliability was established between the two data coders and general consensus on the emerging themes was gained. Following the establishment of these themes, all of the students’ responses were examined and coded according to these categories.

Both the semi-structured interviews and open-ended responses were initially scored and analysed by hand, utilising a content-analysis approach. Content analysis enables researchers to compress large volumes of data into fewer content categories based on rules of coding (Krippendorff, 1980; Stemler, 2001). A combination of a-priori and emergent coding and analysis techniques were utilised to analyse the transcribed interviews. First, an a-priori approach (Weber, 1990) was undertaken to analyse the data’s convergence with already proposed themes based on the quantitative models examined in Studies 1 and 2. That is, the main themes of future goal orientation, perceived instrumental value,
motivation, self-concept, and self-regulation were targeted in the analyses of the qualitative data.

Second, the data were analysed for further emergent themes (grounded theory; Glaser & Strauss, 1967; Lincoln & Guber, 1985). Categories that emerged were separated into key themes and phrases were identified that typified such themes.

Finally, all themes were triangulated across student, teacher, and parent groups as well as across the qualitative and quantitative analyses. Triangulation is the use of multiple methods of data collection in the study of human behaviour (Cohen, Manion, & Morrison, 2000). The current study employed such methods in order to ensure concurrent and external validity. Other techniques were also employed during the data collection phase to ensure validity. These included minimising reactivity effects by conducting interviews in contextual situations that replicated their schooling environment, ensuring inter-rater reliability, preventing the selective use of data, and avoiding making inferences and generalisations beyond the capability of the data to support such conclusions (Cohen et al.). The analyses of the qualitative semi-structured interviews and open-ended responses, and a presentation of summaries of this student, teacher, and parent data, are presented in Chapter 8.

**Summary**

The current chapter has explained the methods that were implemented to answer the hypotheses and research questions proposed for the investigation. A description of the student, teacher, and parent participants was provided as well as an outline of the data collection process particular to cross-cultural research in
PNG. All quantitative instrumentation was discussed and the statistical processes used to examine their psychometric properties were detailed. In addition to reliability analyses and confirmatory factor analyses that examine the psychometric properties of the constructs, factorial invariance, structural equation modeling, and multiple-indicator-multiple-indicator-cause models were outlined and their application to the current study presented. Finally, the procedures for collecting, recording, and analysing data for the qualitative study were also presented. The results of all of the statistical procedures will be presented in the following chapters. Chapter 6 presents the results of the reliability analyses, CFAs, factorial invariance testing, and MIMIC modeling, whilst Chapter 7 presents the results of the SEMs. Finally the qualitative results are presented in Chapter 8.
CHAPTER SIX
RESULTS STUDY 1 -
PREDICTORS OF ACHIEVEMENT IN PAPUA NEW GUINEA STUDENTS: THE STRUCTURE AND NATURE OF FUTURE GOALS, PERCEIVED INSTRUMENTALITY, MOTIVATION, SELF CONCEPT, AND SELF-REGULATION

Introduction

There is a paucity of research that has been undertaken in Indigenous, majority, and developing countries, such as PNG. There is especially a paucity of research that employs quantitative methodologies in these settings (see Chapter 5 for a description of quantitative methodologies). Before structural relations can be examined between variables of interest in these settings, it is important to examine the structure underpinning the instrumentation when applied in such settings.

The current chapter examines the structure of the various instrumentation utilised to measure future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation, as well as the nature of gender, grade, and regional differences in PNG. Analyses are conducted for all instrumentation, namely, the Inventory of School Motivation, the Future Goals Questionnaire-PNG, the academic scales of the Self-Description Questionnaire II-Short, and the Goal Orientation and Learning Strategies Survey. Firstly, results are presented outlining the outcomes of confirmatory factor analyses and reliability analyses. Secondly, invariance test results are presented demonstrating structural stability of the instrumentation across gender, grade, and region.
Finally, models are tested examining the differences in future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation, across gender, grade, and region for PNG students. Results are presented simultaneously for each instrument used according to the numbered hypotheses and research questions posed in Chapter 4. The first construct and corresponding instrument to be examined is motivation and the Inventory of School Motivation (ISM).

**Motivational Goal Orientation: The Inventory of School Motivation**

The ISM is a thirty-four item questionnaire designed to measure eight first-order factors of motivation (task, effort, competition, social power, praise, token, affiliation, and social concern) and three higher-order factors (mastery, performance, and social). In order to address the hypotheses and research questions set forth in Chapter 4 it is necessary to conduct a series of statistical analyses, namely confirmatory factor analyses, reliability analyses, invariance testing, and multiple-indicator-multiple-indicator-cause models. The statistical procedures behind each of these analyses are outlined in Chapter 5. This next section outlines the results of these analyses specifically for students’ responses to the ISM in accordance to the hypotheses and research questions posed in Chapter 4.

**Evaluation of the Structure of Motivation for Students in PNG**

**Factor Structure of the ISM**

*Overview Hypothesis 1.1: Factor structure of the ISM.* Hypothesis 1.1 predicted that PNG students’ responses to the Inventory of School Motivation
ISM) would support the multidimensional model of motivation in that the eight
*a-priori* first-order and three *a-priori* higher-order goal orientation factors would
be identified by confirmatory factor analysis (CFA). In order to evaluate the
structural nature of the data and appropriateness of the ISM for use in PNG, a
series of Confirmatory Factor Analyses (CFAs) were performed. A CFA was
performed on the data where each of the thirty-four items were assigned to load
on only one factor, its designated factor, and factor correlations and uniquenesses
were estimated. As described in Chapter 5, due to the hierarchical nature of
motivation, first-order and higher-order models were also examined.

**Results Hypothesis 1.1: Factor Structure of the ISM.** The first-order
CFA examined the structure of the eight motivation factors (task, effort, praise,
token, competition, social power, affiliation, and social concern). The results of
the CFA demonstrated adequate goodness-of-fit indices, with an RMSEA of .060
a CFI of .94 and a TLI of .93 (see Table 6.1). According to the criteria outlined
in Chapter 5 goodness-of-fit indices are deemed acceptable when the RMSEA is
below .080 and the CFI and TLI are above .90. Emphasis was placed upon these
criteria particularly given the unique cross-cultural setting of the investigation.
When considering the unique sample of Indigenous peoples of PNG from where
the data were collected, it is reasonable to assume that certain language and
cultural factors will have some impact upon the measurement features of the
sampled data. Thus, whilst RMSEA scores below .050 and CFI and TLI scores
above .95 are indicative of good to excellent fits, fit indices below these scores
were still deemed acceptable in the current investigation. Thus, the goodness-of-
fit indices for the first-order model were acceptable.
Table 6.1. Goodness-of-fit Indices for ISM First and Higher Order CFAs

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</table>

Second, a higher-order CFA was conducted to identify the loadings of the eight factors onto three higher-order factors (mastery, performance, and social). Again, according to the criteria outlined in Chapter 5, the goodness-of-fit indices were deemed acceptable, indicated by an RMSEA of .063, a CFI of .93 and a TLI of .92 (see Table 6.1).

It is not sufficient to simply examine the overall fit of the model. One must also examine the individual parameter estimates. First, factor loadings for the individual items need to be examined to determine whether the factors are well-defined by their corresponding items. The factor loadings for the first-order model, displayed in Table 6.2, were sufficient and ranged from .37 to .83. The factor loadings of the eight first-order factors on the three higher-order factors (mastery, performance, and social) were also sufficient for the higher-order model. Task and effort loaded on mastery orientation with loadings of .89 and .96, competition, social power, praise, and token loaded on performance orientation with values of .82, .58, .77, and .95, and affiliation and social concern loaded on social orientation with loadings of .62 and .94.
Table 6.2. Factor Loadings for the Subscales of the ISM

<table>
<thead>
<tr>
<th>Item</th>
<th>Task</th>
<th>Effort</th>
<th>Competition</th>
<th>Power</th>
<th>Praise</th>
<th>Token</th>
<th>Affiliation</th>
<th>Concern</th>
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<td>Power</td>
<td>Praise</td>
<td>Token</td>
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</table>

The correlations between the eight first-order factors are displayed in Table 6.3. This indicates that intercorrelations between factors from within each second-order factor group were higher than those between factor groupings. The correlations between the second-order factors were .53 for mastery and performance, .70 for mastery and social, and .33 for performance and social, and all were significant at the .01 level.
Table 6.3. *Intercorrelations between First-Order Factors of the ISM*

<table>
<thead>
<tr>
<th></th>
<th>Task</th>
<th>Effort</th>
<th>Comp</th>
<th>Power</th>
<th>Praise</th>
<th>Token</th>
<th>Affil</th>
<th>Conc</th>
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<td>.34</td>
<td>.57</td>
<td>.51</td>
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<td>Token</td>
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<td>.74</td>
<td>.58</td>
<td>.73</td>
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<td>.42</td>
<td>.30</td>
<td>.37</td>
<td>.33</td>
<td>.30</td>
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<td>.16</td>
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<td>.18</td>
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</table>

*Note.* Task = task motivation; Effort = effort motivation; Comp = competition motivation; Power = social power motivation; Praise = praise motivation; Token = token motivation; Affil = affiliation motivation; Conc = social concern motivation

**Conclusions Hypothesis 1.1: Factor structure of the ISM.** Hypothesis 1.1 predicted that PNG students’ responses to the Inventory of School Motivation (ISM) would support the multidimensional model of motivation. The findings presented above provide strong support for the multi-dimensionality of motivation and support the use of the ISM as a measure of the eight first-order and three higher-order motivation factors in PNG. These results are similar to those found by McInerney and Ali (2006) and Ali (2006) and therefore Hypothesis 1.1 was accepted.
**Reliability of the ISM**

**Overview Hypothesis 2.1: Reliability of the ISM.** Hypothesis 2.1 predicted that the ISM would be a reliable measure of the eight first-order (task, effort, competition, social power, praise, token, affiliation, and social concern) and the three higher-order (mastery, performance, and social) facets of PNG student motivation. Reliability estimates for each of the ISM subscales and higher-order scales were calculated.

**Results Hypothesis 2.1: Reliability of the ISM.** The results indicated that the reliability estimates for the scales were acceptable. As discussed in Chapter 5, Cronbach’s alphas greater than .70 indicate good reliability levels, however, given the cross-cultural and exploratory nature of the study, alphas greater than .60 are also considered acceptable. The Cronbach’s alphas for the motivation scales are displayed in Table 6.4. The lowest Cronbach’s alphas were found for the task, competition, and social concern subscales; however, once the scales were combined into their higher-order factors these alphas improved substantially. This improvement, however, may be a result of the increased number of items in the higher-order subscales.

The three first-order scales that had lower reliability estimates should be considered with some caution in further analyses that implement the first-order model of motivation. However, as outlined in Chapter 5, given the cross-cultural nature of the study and the unique participant sample, some leniency is available when interpreting the adequacy of reliability estimates. Thus, the reliability scores of these scales were deemed acceptable for use in the current investigation.
Table 6.4. Reliability Estimates for First-Order and Higher-Order ISM Scales

<table>
<thead>
<tr>
<th>Higher-Order Factor</th>
<th>First-Order Factor</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery</td>
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<td>.78</td>
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<tr>
<td></td>
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<td></td>
<td>Effort</td>
<td>.73</td>
</tr>
<tr>
<td>Performance</td>
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<td>Competition</td>
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<td></td>
<td>Social Power</td>
<td>.81</td>
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<td>.78</td>
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<td>Token</td>
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<tr>
<td></td>
<td>Social Concern</td>
<td>.63</td>
</tr>
</tbody>
</table>

Conclusions Hypothesis 2.1: Reliability of the ISM. Hypothesis 2.1 predicted that the ISM first-order and higher-order subscales would have acceptable Cronbach’s alphas. Since the results indicated that both the first-order and higher-order scales demonstrated adequate to good reliabilities, this hypothesis was accepted.
Evaluation of Structural Similarities and Differences across Gender, Grade, and Region for Motivation

Tests of Invariance for the ISM

In the current study, separate covariance matrices were created for the multiple groups – males and females for gender, primary and secondary for grade, and urban, village, and rural for region. The factor structure was then compared across the groups for the instrumentation, systematically holding elements of the factor structure invariant (see Chapter 4). If the introduction of increasingly stringent invariance constraints results in no more than a change of .01 in goodness-of-fit indices, then the factor structure is considered to be invariant across the groups (Cheung & Rensvold, 2002).

The first model examined did not hold any parameters to be invariant (NO INV). As outlined in Chapter 5, a minimum requirement for invariance across groups is for the factor loadings to be consistent (Byrne, 1998). Therefore, holding factor loadings invariant was the second model tested (FL). The third, fourth, and final models tested held factor loadings and factor correlations (FL, FC), factor loadings and uniquenesses (FL, UN), and finally factor loadings, factor correlations, and uniquenesses (FL, FC, UN) invariant. These latter models are performed for completeness; however, emphasis will be placed on the invariance across the groups in the model’s factor loadings.

The next section outlines the results for the research questions posed in Chapter 4 pertaining to tests of invariance and reports the goodness-of-fit indices for the five invariance models tested across gender, grade, and region for the ISM. Changes in the goodness-of-fit indices were examined to determine if the ISM was invariant across gender, grade, and region.
Overview Hypothesis 3.1: Factorial invariance of the ISM across PNG groups. Hypothesis 3.1 predicted that the factor structure of the ISM would be similar across gender, grade, and region. Invariance testing was utilised to test this hypothesis.

Results Hypothesis 3.1: Factorial invariance of the ISM across PNG groups. Invariance testing examined the goodness-of-fit indices across the five models placing increasingly more stringent constraints on the model. The first set of tables (Tables 6.5, 6.6, and 6.7) display the goodness-of-fit statistics for the five models involved in the invariance testing of the first-order motivation model across gender, grade, and region respectively. The second set of tables (Tables 6.8, 6.9, and 6.10) display the goodness-of-fit statistics for the higher-order motivation model across the three groups.

Table 6.5. Invariance Tests across Gender for the Eight-Factor ISM Model of Motivational Goal Orientations

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
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<tr>
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<td>.918</td>
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<td>.062</td>
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<tr>
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<td>.923</td>
<td>.921</td>
<td>.0623</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*
Table 6.6. Invariance Tests across Grade for the Eight-Factor ISM Model of Motivational Goal Orientations

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
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<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
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*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

Table 6.7. Invariance Tests across Region for the Eight-Factor ISM Model of Motivational Goal Orientations

<table>
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<tr>
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<th>TLI</th>
<th>RMSEA</th>
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</thead>
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*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*
Table 6.8. *Invariance Tests across Gender for the Three-Factor Higher-Order ISM Model of Motivational Goal Orientations*

<table>
<thead>
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<th>RMSEA</th>
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<td>.0725</td>
</tr>
<tr>
<td>FL, FC, UN</td>
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<td>.902</td>
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</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

Table 6.9. *Invariance Tests across Grade for the Three-Factor Higher-Order ISM Model of Motivational Goal Orientations*

<table>
<thead>
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<th>Model</th>
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<th>RMSEA</th>
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<td>FL, FC</td>
<td>3399.55</td>
<td>1014</td>
<td>.899</td>
<td>.895</td>
<td>.0740</td>
</tr>
<tr>
<td>FL, UN</td>
<td>4241.09</td>
<td>1032</td>
<td>.875</td>
<td>.872</td>
<td>.0851</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>4817.44</td>
<td>1046</td>
<td>.860</td>
<td>.859</td>
<td>.0916</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*
Table 6.10. *Invariance Tests across Region for the Three-Factor Higher-Order ISM Model of Motivational Goal Orientations*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>3502.81</td>
<td>1455</td>
<td>.901</td>
<td>.892</td>
<td>.0703</td>
</tr>
<tr>
<td>FL</td>
<td>3698.66</td>
<td>1515</td>
<td>.895</td>
<td>.891</td>
<td>.0711</td>
</tr>
<tr>
<td>FL, FC</td>
<td>4014.93</td>
<td>1543</td>
<td>.884</td>
<td>.881</td>
<td>.0750</td>
</tr>
<tr>
<td>FL, UN</td>
<td>5136.79</td>
<td>1579</td>
<td>.854</td>
<td>.853</td>
<td>.0889</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>5777.34</td>
<td>1607</td>
<td>.835</td>
<td>.837</td>
<td>.0954</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

Upon examination of the higher-order model results, it can be seen that some of the goodness-of-fit criteria drop below the levels of a good fit. However, for all three invariance tests of the higher-order model across gender, grade, and region, the RMSEA criteria is consistently below .80, the minimum requirement for an acceptable fit (see Chapter 5). Thus, the goodness-of-fit criteria were deemed at least acceptable for all invariance tests across gender, grade, and region.

As can be seen from Tables 6.5 and 6.8, the change in the CFI and RMSEA acceptable criteria across the five invariance models, does not exceed .01. Thus, the first-order and higher-order ISM factor structure is *fully invariant* across gender according to all goodness-of-fit indices. As shown in Tables 6.6, 6.7, 6.9, and 6.10, the change in goodness-of-fit criteria does not exceed .01 at least for the model in which the factor loadings and correlations are held invariant. Therefore, the factor loadings and factor correlations *only* are invariant.
across grade and region. However, this still meets the minimum requirement of structural invariance of the factor loadings being invariant.

**Conclusions Hypothesis 3.1: Factorial invariance of the ISM across PNG groups.** Hypothesis 3.1 predicted that both the first- and higher-order ISM models of motivation would be invariant across groups of gender, grade, and region. Since, the invariance tests met the minimum requirement levels to demonstrate structural invariance, the ISM first-order and higher-order models were therefore deemed to be invariant across males and females, primary and secondary, and urban, rural, and village groups in PNG. Therefore, Hypothesis 3.1 was accepted.

**Evaluation of Similarities and Differences in Nature across Gender, Grade, and Region for Motivational Goal Orientation**

**Multiple-Indicator-Multiple-Indicator-Cause Models**

Once factorial invariance is established, it is then possible to examine differences between groups in their endorsement of the ISM motivation scales. Multiple-Indicator Multiple-Indicator-Cause (MIMIC) Models examine the influence of grouping independent variables on latent variables. In the present study, MIMIC models were performed to examine the relations between gender, grade, and the gender by grade interaction, upon the first- and higher-order motivation factors of the ISM. That is, it was possible to determine whether there were significant main effects of grade and gender on the motivation scales, and if there was a significant interaction between grade and gender on student motivation. These analyses were performed across the three regional groups in PNG.
Consistent with recommendations made by Aiken and West (1991), grade was zero-centered (put in deviation score form so that the mean is zero) so as to reduce the multicollinearity between grade and the corresponding interaction term. Very high levels of multicollinearity can introduce technical problems in estimating regression coefficients and centering variables often minimises these potential problems. The zero-centered interaction term was calculated by multiplying gender by the zero-centered grade variable.

**ISM MIMIC Results**

**Overview Research question 4.1: Gender, grade, and interaction differences for the ISM.** Research questions 4.1a-c posed whether there are gender and grade differences and gender by grade interaction effects across the eight first-order and three higher-order factors of motivation for urban, village, and rural students. Four MIMIC models (overall region, urban, rural, and village) were performed for the first- and higher-order ISM models. The following section outlines the goodness-of-fit indices and resulting beta coefficients which indicate the presence of significant main effects for grade, gender, and grade x gender interactions.

**Results Research question 4.1: Gender, grade, and interaction differences for the ISM.** MIMIC models were performed examining the main effects of gender and grade and the interaction of gender x grade on the eight first-order and three higher-order ISM motivation factors. Goodness-of-fit indices were acceptable across all MIMIC models and the first-order model results are displayed in Table 6.11 whilst the higher-order model results are displayed in Table 6.12 for the overall, urban, rural, and village samples. As can
be seen in these tables, the goodness-of-fit criteria were acceptable for all the
groups. In addition to the goodness-of-fit criteria, Tables 6.13 and 6.14 display
the beta coefficients for the overall, urban, rural, and village first-order and
higher-order MIMIC models. Any significant main effects (gender and grade) or
interactions (gender x grade) are indicated.

Table 6.11. Goodness-of-fit Indices for Overall, Urban, Rural, and Village First-
Order ISM MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>2235.54</td>
<td>577</td>
<td>.94</td>
<td>.93</td>
<td>.058</td>
</tr>
<tr>
<td>Urban</td>
<td>1172.93</td>
<td>577</td>
<td>.92</td>
<td>.91</td>
<td>.061</td>
</tr>
<tr>
<td>Rural</td>
<td>1320.28</td>
<td>577</td>
<td>.92</td>
<td>.91</td>
<td>.054</td>
</tr>
<tr>
<td>Village</td>
<td>874.29</td>
<td>577</td>
<td>.92</td>
<td>.91</td>
<td>.065</td>
</tr>
</tbody>
</table>

Table 6.12. Goodness-of-fit Indices for Overall, Urban, Rural, and Village
Higher-Order ISM MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>2409.86</td>
<td>574</td>
<td>.93</td>
<td>.92</td>
<td>.061</td>
</tr>
<tr>
<td>Urban</td>
<td>1242.73</td>
<td>574</td>
<td>.91</td>
<td>.90</td>
<td>.064</td>
</tr>
<tr>
<td>Rural</td>
<td>1382.37</td>
<td>574</td>
<td>.92</td>
<td>.91</td>
<td>.056</td>
</tr>
<tr>
<td>Village</td>
<td>868.85</td>
<td>574</td>
<td>.92</td>
<td>.92</td>
<td>.065</td>
</tr>
</tbody>
</table>
Table 6.13. Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for ISM First-Order Motivation Factors for the Overall, Urban, Rural, and Village Samples

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>Grade</td>
<td>Gender</td>
<td>Grade</td>
</tr>
<tr>
<td></td>
<td>x Grade</td>
<td>x Grade</td>
<td>x Grade</td>
<td>x Grade</td>
</tr>
<tr>
<td>Task</td>
<td>.06</td>
<td>.32*</td>
<td>.12</td>
<td>.13</td>
</tr>
<tr>
<td>Effort</td>
<td>.04</td>
<td>.44*</td>
<td>-.19</td>
<td>.10</td>
</tr>
<tr>
<td>Competition</td>
<td>-.05</td>
<td>.02</td>
<td>-.02</td>
<td>.05</td>
</tr>
<tr>
<td>Social Power</td>
<td>-.09*</td>
<td>-.25*</td>
<td>-.04</td>
<td>-.13*</td>
</tr>
<tr>
<td>Praise</td>
<td>.00</td>
<td>-.11</td>
<td>.00</td>
<td>.09</td>
</tr>
<tr>
<td>Token</td>
<td>-.11*</td>
<td>-.15</td>
<td>-.06</td>
<td>-.01</td>
</tr>
<tr>
<td>Affiliation</td>
<td>.09*</td>
<td>-.08</td>
<td>.03</td>
<td>.15*</td>
</tr>
<tr>
<td>Social Concern</td>
<td>.16*</td>
<td>.61*</td>
<td>-.26*</td>
<td>.13</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Table 6.14. *Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for ISM Higher-Order Motivation Factors for the Overall, Urban, Rural, and Village Samples*

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>Grade</td>
<td>Gender</td>
<td>Grade</td>
</tr>
<tr>
<td>Mastery</td>
<td>.06</td>
<td>.43**</td>
<td>-.07</td>
<td>.13</td>
</tr>
<tr>
<td>Performance</td>
<td>-.08*</td>
<td>-.15</td>
<td>-.04</td>
<td>.00</td>
</tr>
<tr>
<td>Social</td>
<td>.16**</td>
<td>.40**</td>
<td>-.18</td>
<td>.13</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Results and conclusions for Research question 4.1a: Gender differences for the ISM. In Chapter 4, Research question 4.1a asked what the effects of gender on the ISM motivation factors would be. For the first-order motivation model, and for the combined region sample, a number of significant findings became apparent. First, females scored significantly ($p<.05$) lower than males for two of the measures of performance goal orientation – social power and token. Second, females scored significantly higher than males for both measures of social goal orientation – affiliation and social concern. This pattern was the same for the urban group, however only social power and affiliation were significant. For the rural group, females were only significantly higher than males for social concern. There were no significant findings for the village group. This could be due to the small sample size of this group and therefore reduced power in the statistical analyses (see Hills, 2005). These gender differences are consistent with past research, which has found that while males tend to score higher than females on performance related motivation, females score significantly higher than males on measures of social goal orientation (Anderman & Anderman, 1999; Leung, Maehr, & Harnisch, 1996; McInerney, et al., 1997; Midgley & Urdan, 1995). These results suggest that some of the same patterns of gender differences that have been found in Western research comprising predominantly European and American samples, can be generalised to the Indigenous, developing, and majority cultural setting of PNG.

For the higher-order model of motivation similar findings were also apparent. For the combined region sample, females scored significantly lower than males on performance goal orientation, but significantly higher than males
in social goal orientation. This finding is consistent with the first-order model results and is again consistent with past literature.

**Results and conclusions for Research question 4.1b: Grade differences for the ISM.** In Chapter 4, Research question 4.1b asked what the effects of grade would be on the first- and higher-order models of motivation. For the first-order model and within the overall sample, as students’ grade level increased their scores on the social power measure of performance orientation significantly decreased. Furthermore, as students’ grade level increased, their scores on the social concern measure of social orientation significantly increased. This pattern was the same for the urban group, however, also included for this group was the significant relation between grade and competition. Similar to the social power factor, as students’ grade increased their scores on competition significantly decreased. There were no further significant main effects of grade for the separate rural and village groups.

Results for the higher-order model found that for the combined sample, as students’ grade levels increased, so did their social goal orientation. This significant main effect was also present for the urban group alone. Also for this group, there was a negative relation between grade and performance, that is, as grade increased, students’ performance goal orientation decreased. In addition to this, for the combined sample, as students’ grade levels increased their mastery goal orientation also significantly increased.

Therefore, upon examining both models of motivation, it seems that as students’ grade levels increase, their levels of endorsement of mastery and social motivation goals increase but their endorsement of performance-related goals decrease. It is not sufficient, however, to examine main effects in isolation.
Therefore the next section presents the findings of the interaction effects of grade and gender on student motivational profiles.

**Results and conclusions for Research question 4.1c: Gender x grade interaction effects for the ISM.** Finally, Research question 4.1c asked if there were any significant interaction effects between gender and grade for the first- and higher-order motivation models. The results showed that there was only one significant interaction effect of gender and grade for the first-order social concern factor, and it was only apparent for the overall and urban samples. It is necessary to plot any significant interaction effects in order to gain a complete understanding of their effect on outcome variables. Therefore, this significant interaction between gender and grade on the social concern variable is depicted pictorially in Figure 6.1 for the overall sample and in Figure 6.2 for the urban sample. It can be seen in Figure 6.1 that there is a substantial difference between males and females in Grades 6, 8, and 9 (with females scoring higher than males); however this difference is reduced in Grade 11 and non-existent in Grades 7, 10 and 12.

Furthermore it can be seen in Figure 6.2 that for the urban sample, females scored higher on social concern than males in Grades 6, 8, and 11, however, this trend is reversed and there is a smaller difference between males and females in Grade 12. Therefore, although overall, students’ social concern goals increase as they get older, the gap between males and females on these social concern goals closes as their grade level increases.
Figure 6.1. Gender x grade interaction effect on social concern for the overall sample

Figure 6.2. Gender x grade interaction effect on social concern for the urban sample
Section Summary

In summary, this section has outlined the results pertaining to the first- and higher-order models of motivation as measured by the ISM. The ISM was found to be a valid and reliable measure of the eight first-order and three higher-order factors of motivation as indicated by confirmatory factor analyses and reliability analyses. In addition to this, both models were found to be invariant in structure across gender, grade, and region. Finally, MIMIC models were conducted to examine the relations between gender, grade, and the gender x grade interaction across regions for both motivation models, and significant findings were highlighted. The following sections outline the results for the remaining instrumentation measuring future goal orientation, perceived instrumental value, self-concept, and self-regulation.

Future Goal Orientation: The Future Goals Questionnaire-PNG

The Future Goals Questionnaire-PNG is a sixty-four item questionnaire which measures the future goals that PNG students hold and the perceived instrumental value of schooling in helping students to achieve those goals. Sixteen of the sixty-four items measure three categories of future goals – success, authority, and village-oriented goals and aspirations. The remaining forty-eight items measure the perceived instrumentality of these future goals and will be returned to later. This section reports the results of CFAs and reliability analyses for the three-factor model of future goal orientation for PNG students.
Evaluation of the Structure of Future Goals for Students in PNG

Factor Structure of the FGQ-PNG

Overview Hypothesis 1.2: Factor structure of the future goal scales of the FGQ-PNG. As stated in Chapter 4, Hypothesis 1.2 predicted that the FGQ-PNG would be a valid measure of the three factors of future goal orientations – success, authority, and village future goals. In order to test this hypothesis in PNG, a CFA was performed on the FGQ-PNG to examine the validity of this three-factor model.

Results Hypothesis 1.2: Factor structure of the future goal scales of the FGQ-PNG. A CFA was performed on the sixteen items comprising the three subscales of the future goal scales of the FGQ-PNG. Three items were removed from the analysis due to low factor loadings and high uniquenesses. A second CFA was performed on the remaining thirteen items and this model demonstrated an adequate fit with the data. Goodness-of-fit indices and item factor loadings are displayed in Tables 6.15 and 6.16 respectively. According to the criteria presented in Chapter 5, the CFI and RMSEA goodness-of-fit indices indicated an adequate fit with the data, and the factor loadings were substantial, ranging from .46 to .70, thus confirming the validity of the instrument for use amongst the current study’s PNG sample.

Table 6.15. Goodness-of-fit Indices for the FGQ-PNG First-Order CFA

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Order CFA</td>
<td>401.44</td>
<td>62</td>
<td>.92</td>
<td>.89</td>
<td>.080</td>
</tr>
</tbody>
</table>
Table 6.16. Factor Loadings for the Subscales of the FGQ-PNG

<table>
<thead>
<tr>
<th>Item</th>
<th>Success</th>
<th>Authority</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S3</td>
<td>.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4</td>
<td>.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S5</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S6</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td></td>
<td></td>
<td>.62</td>
</tr>
<tr>
<td>V2</td>
<td></td>
<td></td>
<td>.47</td>
</tr>
<tr>
<td>V3</td>
<td></td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>V4</td>
<td></td>
<td></td>
<td>.62</td>
</tr>
</tbody>
</table>

Conclusions Hypothesis 1.2: Factor structure of the future goal scales of the FGQ-PNG. Hypothesis 1.2 predicted that the FGQ-PNG would be a valid measure of the three facets of students’ future goal orientation. Given the acceptable goodness-of-fit indices and factor loadings of the thirteen-item scale, Hypothesis 1.2 was accepted.
Reliability Analyses

Overview Hypothesis 2.2: Reliability of the future goal scales of the FGQ-PNG. Hypothesis 2.2 predicted that the three future goal scales would be reliable measures of the success, authority, and village future goal orientation scales. To test this, reliability analyses were performed on the three future goal scales of the FGQ-PNG. Cronbach’s alphas were calculated and presented for each of the scales.

Results Hypothesis 2.2: Reliability of the future goal scales of the FGQ-PNG. Reliability analyses were conducted on the future goal scales of the FGQ-PNG. The reliability estimates were .66, .66, and .69 for the success, authority, and village subscales. As outlined in Chapter 5, these reliability estimates are adequate for exploratory and cross-cultural research (Nunnelly, 1978; Streiner & Norman, 2003).

Conclusions Hypothesis 2.2: Reliability of the future goal scales of the FGQ-PNG. Hypothesis 2.2 stated that the success, authority, and village goal scales of the FGQ-PNG would demonstrate acceptable reliability. Since the reliability estimates were deemed acceptable for cross-cultural research, the hypothesis was therefore supported.

Evaluation of Structural Similarities and Differences across Gender, Grade, and Region for Future Goals

Tests of Invariance for the Future Goal Scales of the FGQ-PNG

Overview Hypothesis 3.2: Factorial invariance of the future goal scales of the FGQ-PNG across PNG groups. Hypothesis 3.2 predicted that the three future goal scales of the FGQ-PNG would be invariant across gender, grade, and
region. To test this hypothesis, invariance testing was employed to determine if the factor loadings, factor correlations, and uniquenesses for the three-factor model were invariant across groups of gender, grade, and region.

**Results Hypothesis 3.2: Factorial invariance of the future goal scales of the FGQ-PNG across PNG groups.** Invariance testing was conducted on the future goal scales of the FGQ-PNG to examine the fit indices of the five models of increasingly more stringent parameter restrictions. Tables 6.17, 6.18, and 6.19 display the goodness-of-fit changes across the five models of invariance (outlined earlier) for gender, grade, and region respectively.

Table 6.17. *Invariance Tests across Gender for the Three-Factor FGQ-PNG Model of Future Goals*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>499.51</td>
<td>124</td>
<td>.904</td>
<td>.879</td>
<td>.0839</td>
</tr>
<tr>
<td>FL</td>
<td>519.57</td>
<td>134</td>
<td>.901</td>
<td>.885</td>
<td>.0818</td>
</tr>
<tr>
<td>FL, FC</td>
<td>524.21</td>
<td>140</td>
<td>.901</td>
<td>.890</td>
<td>.0798</td>
</tr>
<tr>
<td>FL, UN</td>
<td>541.95</td>
<td>149</td>
<td>.897</td>
<td>.891</td>
<td>.0790</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>547.93</td>
<td>153</td>
<td>.897</td>
<td>.895</td>
<td>.0774</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*
Table 6.18. Invariance Tests across Grade for the Three-Factor FGQ-PNG Model of Future Goals

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
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<td><strong>920</strong></td>
<td>.899</td>
<td><strong>.0743</strong></td>
</tr>
<tr>
<td>FL</td>
<td>456.11</td>
<td>134</td>
<td><strong>912</strong></td>
<td>.897</td>
<td><strong>.0748</strong></td>
</tr>
<tr>
<td>FL, FC</td>
<td>545.76</td>
<td>140</td>
<td>.895</td>
<td>.883</td>
<td>.0821</td>
</tr>
<tr>
<td>FL, UN</td>
<td>683.45</td>
<td>147</td>
<td>.863</td>
<td>.855</td>
<td>.0922</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>833.47</td>
<td>153</td>
<td>.838</td>
<td>.835</td>
<td>.1020</td>
</tr>
</tbody>
</table>

Note: Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.

Table 6.19. Invariance Tests across Region for the Three-Factor FGQ-PNG Model of Future Goals

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
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<td>519.36</td>
<td>186</td>
<td>.908</td>
<td>.884</td>
<td><strong>.0793</strong></td>
</tr>
<tr>
<td>FL</td>
<td>564.98</td>
<td>206</td>
<td>.899</td>
<td>.885</td>
<td><strong>.0782</strong></td>
</tr>
<tr>
<td>FL, FC</td>
<td>665.70</td>
<td>218</td>
<td>.883</td>
<td>.874</td>
<td>.0849</td>
</tr>
<tr>
<td>FL, UN</td>
<td>903.52</td>
<td>232</td>
<td>.825</td>
<td>.824</td>
<td>.1010</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>1036.59</td>
<td>244</td>
<td>.803</td>
<td>.811</td>
<td>.1070</td>
</tr>
</tbody>
</table>

Note: Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.

As can be seen in Table 6.17, for the model testing invariance across gender, only the CFI goodness-of-fit criteria were deemed acceptable. For the invariance model examining the factor structure of the FGQ-PNG across grade (Table 6.18), both the CFI and RMSEA criteria were acceptable, whilst for the model
examining invariance across regional groups (Table 6.19), only the RMSEA was acceptable (and only marginally).

As can be seen in the tables, according to at least one criteria of goodness-of-fit in each analysis (e.g., CFI or RMSEA), invariance was achieved for the FGQ-PNG. The factor loadings and factor correlations only were invariant across gender, and the factor loadings only were invariant for grade and region. However, since the minimum requirement for invariance (factor loadings only) was met for all three analyses, invariance was achieved for the future goal scales of the FGQ-PNG across gender, grade, and region. Whilst for some analyses this was met only at marginal levels, as outlined earlier, this may be expected, given the nature and source of the data collected.

Conclusions Hypothesis 3.2: Factorial invariance of the future goal scales of the FGQ-PNG across PNG groups. Hypothesis 3.2 stated that the three factor structure of the future goal scales of the FGQ-PNG would be invariant across gender, grade, and regional groups in PNG. Since the minimum requirement of invariance was met for each of these groups, the hypothesis was supported. Therefore, since the FGQ-PNG future goal scales have been found to be valid, reliable, and invariant across gender, grade, and region, it is now possible to examine the main effects and interactions of gender, grade, and region on the success, authority, and village future goal scales. These analyses are outlined in the next sections.
Evaluation of Similarities and Differences in Nature across Gender, Grade, and Region for Future Goal Orientation

FGQ-PNG MIMIC Results

Overview Research question 4.2: Gender, grade, and interaction differences for the future goal scales of the FGQ-PNG. Research questions 4.2a-c asked whether there are gender and grade differences and gender by grade interaction effects across the three future goal scales of the FGQ-PNG for urban, village, and rural students. Therefore, for the FGQ-PNG three-factor model, four MIMIC models were performed on the overall, urban, rural, and village samples, examining the main effects of gender and grade and the interaction effect between gender and grade on future goal orientation.

Results Research question 4.2: Gender, grade, and interaction differences for the future goal scales of the FGQ-PNG. MIMIC models were performed on the success, authority, and village future goal scales to determine if there were any significant gender and grade main effects or a gender by grade interaction effect. The goodness-of-fit indices and beta coefficients for these MIMIC models are displayed in Tables 6.20 and 6.21. The models all demonstrated acceptable goodness-of-fit indices demonstrated by RMSEA scores lower than .80 and CFI and TLI indices greater than .90 (excluding the rural sample). Significant main effects and interactions are discussed below for each of the three research questions.
Table 6.20. Goodness-of-fit Indices for Overall, Urban, Rural and Village FGQ-PNG MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>475.14</td>
<td>92</td>
<td>.93</td>
<td>.90</td>
<td>.070</td>
</tr>
<tr>
<td>Urban</td>
<td>228.11</td>
<td>92</td>
<td>.92</td>
<td>.90</td>
<td>.073</td>
</tr>
<tr>
<td>Rural</td>
<td>301.68</td>
<td>92</td>
<td>.89</td>
<td>.86</td>
<td>.072</td>
</tr>
<tr>
<td>Village</td>
<td>120.32</td>
<td>92</td>
<td>.95</td>
<td>.93</td>
<td>.050</td>
</tr>
</tbody>
</table>

Results and conclusions for Research question 4.2a: Gender differences for the future goal scales of the FGQ-PNG. Research question 4.2a asked whether there were any differences between males and females in their endorsement of success, authority, and village goals. Significant main effects for gender were found only for the overall and urban samples. For the overall sample, the gender main effect was significant for the success and authority categories of future goals. These main effects indicated that females scored significantly higher on success orientations whilst males scored significantly higher than females on authority orientations. This pattern was the same for the urban sample however in addition to the gender main effects for success and authority, females also scored significantly higher than males in village orientations within the urban sample only.
Table 6.21. Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for Future Goals Factors for the Overall, Urban, Rural and Village Samples

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>Grade</td>
<td>Gender</td>
<td>Grade</td>
</tr>
<tr>
<td>Success</td>
<td>-.13*</td>
<td>.27*</td>
<td>-.02</td>
<td>.15*</td>
</tr>
<tr>
<td>Authority</td>
<td>-.12*</td>
<td>-.13</td>
<td>-.18</td>
<td>-.21*</td>
</tr>
<tr>
<td>Village</td>
<td>.06</td>
<td>.23</td>
<td>.00</td>
<td>.16*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Results and conclusions for Research question 4.2b: Grade differences for the future goal scales of the FGQ-PNG. Next, Research question 4.2b asked whether or not there were any significant differences across grades for the three types of future goals. For grade, the only significant main effect was found for the overall sample for success goals. For this sample, as students’ grade levels increased, their endorsement of success orientation goals also significantly increased. No other significant grade main effects were found.

Results and conclusions for Research question 4.2c: Gender x grade interaction effects for the future goal scales of the FGQ-PNG. Research question 4.2c asked whether there was a significant interaction effect between gender and grade for the three types of future goals. There were no significant interaction effects of grade and gender on future goal orientation for the overall, urban, rural, or village samples.

Section Summary

In summary, gender effects were found for all three types of future goal orientations with females endorsing success and village goals more than males, and males endorsing authority goals more than females. There was one significant grade effect which indicated that students’ success orientations increased as their grade levels increased. There were no significant interaction effects between gender and grade in influencing students’ future goal orientations. Similar to future goal orientations, the next section examines the students’ perceptions about the instrumental value of their schooling experiences in helping them to achieve their success, authority, and village future goals.
Perceived Instrumental Value: The Future Goals Questionnaire-PNG

The FGQ-PNG also measures the perceived instrumental value that students place on their schooling in helping them to attain their future goals. The remaining forty-eight items of the FGQ-PNG ask students whether or not attending school, getting good grades, and completing assigned work, helps them to achieve their goals and aspirations that they set for their future. As outlined in Chapter 5, each future goal has three perceived instrumental value items that are averaged to form a total of sixteen corresponding perceived instrumental value items. Since three items in the future goal model were removed from the analyses these same three items were removed from the perceived instrumental value model. These thirteen perceived instrumental value items were then added with the thirteen future goal items to form a six-factor model. Therefore a twenty-six item, six-factor model was evaluated for validity, reliability, and invariance across gender, grade, and region groups. These analyses are presented in the sections that follow.

Evaluation of the Structure of Perceived Instrumental Value for Students in PNG

Factor Structure of the FGQ-PNG

Overview Hypothesis 1.3: Factor structure of the perceived instrumental value scales of the FGQ-PNG. In Chapter 4, Hypothesis 1.3 predicted that the six-factor future goal and perceived instrumental value model would be a valid measure of the three future goal scales and the three perceived instrumental value scales. To test this hypothesis, a CFA was performed on the FGQ-PNG to examine the validity of this six-factor model.
Results Hypothesis 1.3: Factor structure of the perceived instrumental value scales of the FGQ-PNG. A CFA was performed on the twenty-six future goal and perceived instrumental value items to examine the validity of the six-factor model. Corresponding future goal and perceived instrumental value item uniquenesses from the same categories were correlated due to the identical use in wording. For example, for the future goal item “It is important to me to help look after my parents and siblings” one of the corresponding perceived instrumental value items was “Attending school is important to help look after my parents and siblings”. Therefore, in order to account for this common variance between the items, it was necessary for the uniquenesses to be correlated between items with corresponding wording (Marsh & Hau, 1996).

This six-factor model demonstrated a good fit with the data as indicated by the goodness-of-fit indices. The CFI and TLI demonstrated excellent fits with the data and are displayed in Table 6.22. Furthermore, item factor loadings are displayed in Table 6.23. The factor loadings ranged from .43 to .79 and all items loaded sufficiently on their appropriate factors.

Table 6.22. Goodness-of-fit Indices for the Six-Factor FGQ-PNG CFA

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Order CFA</td>
<td>1375.49</td>
<td>271</td>
<td>.96</td>
<td>.95</td>
<td>.070</td>
</tr>
</tbody>
</table>
Table 6.23. *Factor Loadings for the Subscales of the Six-Factor FGQ-PNG*

<table>
<thead>
<tr>
<th>Item</th>
<th>Success</th>
<th>Authority</th>
<th>Village</th>
<th>Success</th>
<th>Authority</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FG</td>
<td>FG</td>
<td>FG</td>
<td>PIV</td>
<td>PIV</td>
<td>PIV</td>
</tr>
<tr>
<td>SFG1</td>
<td>.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFG2</td>
<td>.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFG3</td>
<td>.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFG4</td>
<td>.47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFG5</td>
<td>.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFG6</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFG1</td>
<td></td>
<td>.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFG2</td>
<td></td>
<td>.64</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFG3</td>
<td></td>
<td>.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFG1</td>
<td></td>
<td></td>
<td>.69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFG2</td>
<td></td>
<td></td>
<td>.64</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VFG3</td>
<td></td>
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<td>.60</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VFG4</td>
<td></td>
<td></td>
<td>.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV1</td>
<td></td>
<td></td>
<td></td>
<td>.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV2</td>
<td></td>
<td></td>
<td></td>
<td>.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV3</td>
<td></td>
<td></td>
<td></td>
<td>.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV4</td>
<td></td>
<td></td>
<td></td>
<td>.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV5</td>
<td></td>
<td></td>
<td></td>
<td>.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIV6</td>
<td></td>
<td></td>
<td></td>
<td>.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APIV1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td>APIV2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Success</td>
<td>Authority</td>
<td>Village</td>
<td>Success</td>
<td>Authority</td>
<td>Village</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>-----------</td>
<td>---------</td>
<td>---------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>FG</td>
<td>FG</td>
<td>FG</td>
<td>PIV</td>
<td>PIV</td>
<td>PIV</td>
</tr>
<tr>
<td>APIV3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.62</td>
<td></td>
</tr>
<tr>
<td>VPIV1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>VPIV2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>VPIV3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>VPIV4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.55</td>
<td></td>
</tr>
</tbody>
</table>

*Note. FG = future goal orientation; PIV = perceived instrumental value.*

Conclusions

Hypothesis 1.3: Factor structure of the perceived instrumental value scales of the FGQ-PNG. Hypothesis 1.3 predicted that the six-factor model of future goal orientation and perceived instrumental value would be valid for use in PNG. The results found that the six-factor model of success, authority, and village future goals and perceived instrumental value did emerge with an excellent model fit. Therefore, the hypothesis was supported.

Reliability of the FGQ-PNG

Overview

Hypothesis 2.3: Reliability of the perceived instrumental value scales of the FGQ-PNG. Next, Hypothesis 2.3 stated that the three perceived instrumental value scales would demonstrate acceptable reliability levels. Therefore, three reliability analyses were performed on the three additional perceived instrumental value scales of the FGQ-PNG and Cronbach’s alphas were presented.

Results

Hypothesis 2.3: Reliability of the perceived instrumental value scales of the FGQ-PNG. It was hypothesised that the success, authority, and
village instrumentality scales would also have acceptable Cronbach’s alphas. The reliability estimates were .80, .70, and .76 for the success, authority, and village perceived instrumental value subscales. Thus, the three perceived instrumental value subscales demonstrated good reliabilities.

**Conclusions Hypothesis 2.3: Reliability of the perceived instrumental value scales of the FGQ-PNG.** Hypothesis 2.3 stated that the three perceived instrumental value scales would be reliable measures of students’ success, authority, and village instrumentality. Since all Cronbach’s alphas were greater than .70, the hypothesis was therefore supported.

**Evaluation of Structural Similarities and Differences across Gender, Grade, and Region for Perceived Instrumental Value**

**Tests of Invariance for the FGQ-PNG**

Invariance testing was then conducted on the combined future goal and perceived instrumentality six-factor model, to determine if the model’s factor loadings, factor correlations, and uniquenesses were invariant across groups.

**Overview Hypothesis 3.3: Factorial invariance of the perceived instrumental value scales of the FGQ-PNG across PNG groups.** It was again predicted in Hypothesis 3.3, that the model would be invariant across gender, grade, and region. Therefore, invariance testing was performed to examine the invariance of the structure of the six-factor model of future goals and perceived instrumental value across groups in PNG.

**Results Hypothesis 3.3: Factorial invariance of the perceived instrumental value scales of the FGQ-PNG across PNG groups.** Invariance testing was performed on the FGQ-PNG to determine whether the instrument
was invariant across gender, grade, and regional groups in PNG. Tables 6.24, 6.25, and 6.26 display the goodness-of-fit changes across the five models of invariance for gender, grade, and region respectively.

As can be seen in Tables 6.24 and 6.25, the TLI and RMSEA criteria was acceptable across all five models, and did not exceed a change greater than .01 across these models. Therefore, the six-factor model of future goal orientation and perceived instrumental value was fully invariant across gender and grade according to the TLI and RMSEA criteria. In addition to this, Table 6.26 shows that all goodness-of-fit indices were acceptable and did not change more than .01 at the model where factor loadings and correlations are held invariant. Therefore, the factor loadings and factor correlations were invariant across region, which still meets the minimum requirement for structural invariance.

Table 6.24. Invariance Tests across Gender for the Six-Factor FGQ-PNG Model of Future Goals and Perceived Instrumental Value

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>1674.52</td>
<td>542</td>
<td>.948</td>
<td>.937</td>
<td>.0735</td>
</tr>
<tr>
<td>FL</td>
<td>1704.77</td>
<td>562</td>
<td>.947</td>
<td>.939</td>
<td>.0725</td>
</tr>
<tr>
<td>FL, FC</td>
<td>1731.85</td>
<td>583</td>
<td>.947</td>
<td>.941</td>
<td>.0714</td>
</tr>
<tr>
<td>FL, UN</td>
<td>1778.17</td>
<td>601</td>
<td>.946</td>
<td>.941</td>
<td>.0712</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>1792.88</td>
<td>622</td>
<td>.946</td>
<td>.944</td>
<td>.0698</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.
Table 6.25. Invariance Tests across Grade for the Six-Factor FGQ-PNG Model of Future Goals and Perceived Instrumental Value

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>1563.23</td>
<td>542</td>
<td>.950</td>
<td>.940</td>
<td>.0699</td>
</tr>
<tr>
<td>FL</td>
<td>1592.44</td>
<td>562</td>
<td>.949</td>
<td>.941</td>
<td>.0690</td>
</tr>
<tr>
<td>FL, FC</td>
<td>1708.82</td>
<td>583</td>
<td>.946</td>
<td>.940</td>
<td>.0708</td>
</tr>
<tr>
<td>FL, UN</td>
<td>1987.74</td>
<td>601</td>
<td>.938</td>
<td>.933</td>
<td>.0774</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>2150.23</td>
<td>622</td>
<td>.935</td>
<td>.932</td>
<td>.0798</td>
</tr>
</tbody>
</table>

**a** Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.

Table 6.26. Invariance Tests across Region for the Six-Factor FGQ-PNG Model of Future Goals and Perceived Instrumental Value

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>1885.74</td>
<td>813</td>
<td>.946</td>
<td>.935</td>
<td>.0718</td>
</tr>
<tr>
<td>FL</td>
<td>1951.94</td>
<td>853</td>
<td>.944</td>
<td>.936</td>
<td>.0709</td>
</tr>
<tr>
<td>FL, FC</td>
<td>2078.96</td>
<td>895</td>
<td>.941</td>
<td>.935</td>
<td>.0719</td>
</tr>
<tr>
<td>FL, UN</td>
<td>2580.10</td>
<td>931</td>
<td>.928</td>
<td>.924</td>
<td>.0832</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>2724.37</td>
<td>973</td>
<td>.924</td>
<td>.924</td>
<td>.0839</td>
</tr>
</tbody>
</table>

**a** Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.

Conclusions

Hypothesis 3.3: Factorial invariance of the perceived instrumental value scales of the FGQ-PNG across PNG groups. Hypothesis 3.3 stated that the six-factor model of future goal orientation and perceived instrumental value would be invariant across gender, grade, and region. Since the
minimum requirements for factorial invariance were met for each of the group analyses, the hypothesis was therefore supported.

To summarise, the psychometric properties of the six-factor model of future goal orientation and perceived instrumental value, have been shown to be good for use in PNG. That is, the FGQ-PNG is a valid and reliable measure of the three future goal scales and the three perceived instrumental value scales, and they have been found to display invariance across groups of gender, grade, and region. It is now possible to examine differences in perceived instrumental value between genders and grade levels and the interaction between these two groups, across the three regions in PNG. These analyses are presented in the following sections.

*Evaluation of Similarities and Differences in Nature across Gender, Grade, and Region for Perceived Instrumental Value*

*FGQ-PNG MIMIC Results*

*Overview Research question 4.3: Gender, grade, and interaction differences for the perceived instrumental value scales of the FGQ-PNG.*

Research questions 4.3a-c asked whether there are any gender and grade differences or a gender by grade interaction effect upon the three scales of students’ perceived instrumental value. That is, are there any groups differences or interactions upon the value that the PNG students’ place on school in helping them to reach future goals concerned with success, gaining authority positions or status, and contributing to one’s village and family. Therefore, a series of analyses were performed to investigate the differences across gender, grade, and region on students’ scores on the three perceived instrumental value scales. Four
MIMIC models were performed on the overall, urban, rural, and village samples, examining the main effects of gender and grade and the interaction effect between gender and grade on perceived instrumental value. The goodness-of-fit indices and beta coefficients for perceived instrumental value only are displayed in Tables 6.27 and 6.28. As can be seen in Table 6.27, the goodness-of-fit indices are acceptable according to the CFI and TLI criteria only. The gender and grade main effects and the interaction will be discussed in the following sections.

Table 6.27. Goodness-of-fit Indices for Overall, Urban, Rural, and Village FGQ-PNG MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>770.70</td>
<td>92</td>
<td>.94</td>
<td>.92</td>
<td>.093</td>
</tr>
<tr>
<td>Urban</td>
<td>302.17</td>
<td>92</td>
<td>.94</td>
<td>.93</td>
<td>.090</td>
</tr>
<tr>
<td>Rural</td>
<td>430.31</td>
<td>92</td>
<td>.93</td>
<td>.90</td>
<td>.091</td>
</tr>
<tr>
<td>Village</td>
<td>200.93</td>
<td>92</td>
<td>.93</td>
<td>.92</td>
<td>.098</td>
</tr>
</tbody>
</table>
Table 6.28. *Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for Future Goals Factors for the Overall, Urban, Rural, and Village Samples*

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>Grade</td>
<td>Gender</td>
<td>Grade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>x Grade</td>
<td></td>
<td>x Grade</td>
</tr>
<tr>
<td>Success</td>
<td>-.07**</td>
<td>.04*</td>
<td>.08*</td>
<td>-.07</td>
</tr>
<tr>
<td>Authority</td>
<td>.03</td>
<td>-.07**</td>
<td>-.18**</td>
<td>.04</td>
</tr>
<tr>
<td>Village</td>
<td>-.04</td>
<td>.01</td>
<td>.06</td>
<td>-.06</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Results and conclusions for Research question 4.3a: Gender

differences for the perceived instrumental value scales of the FGQ-PNG.

Research question 4.3a asked whether there were any differences between males and females in their endorsement of success, authority, and village perceived instrumental value. Significant main effects for gender were found for the overall and rural samples. For these groups, the gender main effect was significant for the perceived instrumental value of schooling to reach success goals. Males scored significantly higher on success perceived instrumentality than females did and this pattern was the same for the rural sample. It was also consistent in trend for the urban and village samples but not significant.

Therefore it seems, that while females endorse success goals to a greater degree than males do (discussed earlier), males value the importance of schooling in attaining these success goals to a greater extent than females do. The implications of these findings will be discussed in further detail in the following chapters and the interaction between future goal orientation and perceived instrumental value will be explored.

Results and conclusions for Research question 4.3b: Grade differences for the perceived instrumental value scales of the FGQ-PNG. Research question 4.3b asked whether or not there were any significant differences across grades for the three types of perceived instrumental value. For grade, the only significant main effect was found in the overall sample for both success and authority instrumentality. In this sample, as students’ grade levels increased, their endorsement of success instrumental value significantly increased, whilst their endorsement of authority instrumental value significantly decreased. The implications of these findings, particularly the positive and negative relations
between these perceived instrumental value beliefs and student outcomes will be explored in the next chapter.

**Results and conclusions for Research question 4.3c: Gender x grade interaction effects for the perceived instrumental value scales of the FGQ-PNG.** Research question 4.3c asked whether there was a significant interaction effect between gender and grade for the three types of perceived instrumental value. Significant interactions were found for the overall and urban samples only. For the overall sample significant interactions were found for both success and authority instrumentality, whilst the authority interaction only was found to be significant for the urban sample. These interactions can be viewed pictorially in Figures 6.3 and 6.4.

*Figure 6.3. Gender x grade interaction effect on success instrumental value for the PNG sample*
As can be seen in Figure 6.3, there is general consistency between the male and female groups except for in Grade 10, when males have significantly higher success instrumentality scores than females. This peak in success instrumental value may be due to the pressure placed on students when they enter this phase of their schooling. Grade 10 is a significant grade of schooling in PNG and it is extremely rare for students to progress beyond this grade level and enter into senior high school. It seems that males in particular are perhaps being influenced by this pressure and that it is having a positive influence on their perception of the value of schooling in helping them to achieve future success related goals, such as getting into university and getting a job.

Furthermore, as displayed in Figure 6.4, the gap between males and females in their authority instrumentality scores significantly reduces as students increase in their grade levels. In addition to this, overall, students’ authority instrumental value scores decrease substantially in the higher grade levels,
although males are still slightly higher than females in Grade 11. The implications of these findings will be discussed in conjunction with analyses conducted in the next chapter, examining the relations between success and authority instrumentality and student outcomes variables.

Section Summary

In summary, this section has examined the validity and reliability of the FGQ-PNG, the invariance of its factor structure across gender, grade, and region, and the gender, grade, and gender x grade interaction effects on the three perceived instrumental value factors. This process is replicated in the following sections for measures of student self-concept.

Self-Concept: Self-Description Questionnaire

The next construct that was examined in the current investigation was students’ self-concept. This was investigated using the academic items from the Self-Description Questionnaire II Short (SDQII-S) which measure three factors of self-concept – general academic, English, and mathematics self-concept. The following section reports the findings of analyses examining the validity, reliability, and invariance of the instrument, and self-concept differences across gender, grade, and region are reported.

Evaluation of the Structure of Self-Concept for Students in PNG

Factor Structure of the SDQII-S

Overview Hypothesis 1.4: Factor structure of the SDQII-S academic scales. Hypothesis 1.4 predicted that the SDQII-S would be a valid measure of
the general academic, English, and mathematics self-concept factors and that the
tree-factor structure would be supported by the PNG data. A CFA was
carried out on the PNG sample to test this hypothesis.

Results Hypothesis 1.4: Factor structure of the SDQII-S academic

scales. After the reverse coding of three negatively worded questions, a CFA was
performed on the SDQII-S. One of these reverse-coded items was deleted due to
a low factor loading (<.30). According to Marsh (1996) it is not uncommon for
negatively worded items to distort the accuracy of the measurement of a
construct particularly across groups of different education levels or cultures.
Therefore, it was understandable to remove the distorted item from the self-
concept analyses in the current investigation. After this, the resulting model
demonstrated good fit indices and parameter estimates for the English,
mathematics, and general self-concept factors. The goodness-of-fit indices and
item loadings are displayed in Tables 6.29 and 6.30. Furthermore the correlations
between the general and English, general and mathematics, and English and
mathematic subscales were .51, .51, and -.15 and all were significant at the .05
level.

Table 6.29. Goodness-of-fit Indices for the Three-Factor SDQII-S CFA

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Order CFA</td>
<td>255.52</td>
<td>51</td>
<td>.95</td>
<td>.96</td>
<td>.068</td>
</tr>
</tbody>
</table>
Table 6.30. *Factor Loadings for the Subscales of the SDQII-S*

<table>
<thead>
<tr>
<th>Item</th>
<th>General</th>
<th>English</th>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2</td>
<td>.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td></td>
<td>.79</td>
<td></td>
</tr>
<tr>
<td>E2</td>
<td></td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td>E3</td>
<td></td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>E4</td>
<td></td>
<td>.63</td>
<td></td>
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<tr>
<td>E5</td>
<td></td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td></td>
<td></td>
<td>.83</td>
</tr>
<tr>
<td>M2</td>
<td></td>
<td></td>
<td>.80</td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td></td>
<td>.85</td>
</tr>
<tr>
<td>M4</td>
<td></td>
<td></td>
<td>.48</td>
</tr>
</tbody>
</table>

**Conclusions Hypothesis 1.4: Factor structure of the SDQII-S academic scales.** Therefore, since the three-factor structure of self-concept emerged from the PNG data, the hypothesis, that the SDQII-S would be a valid measure of the three factors of academic self-concept, was supported. The next section presents the findings of the reliability analyses.
Reliability of the SDQII-S

Overview Hypothesis 2.4: Reliability of the SDQII-S academic scales.

Hypothesis 2.4 stated that the three self-concept scales would be reliable measures of students’ general, English, and mathematics self-concepts. Thus, three reliability analyses were performed on the three SDQII-S scales.

Results Hypothesis 2.4: Reliability of the SDQII-S academic scales.

Results, indicated by Cronbach’s alphas, showed that the scales had good reliability for use in PNG. The Cronbach’s alphas for the general academic, English, and mathematics subscales respectively were .75, .79, and .82.

Conclusions Hypothesis 2.4: Reliability of the SDQII-S academic scales. Hypothesis 2.4 predicted that the three academic self-concept scales would be reliable measures of students’ general, English, and mathematics self-concepts. Since all reliability estimates were greater than .70 for the PNG sample, this hypothesis was supported.

Again, once the validity and reliability of an instrument has been confirmed, it is then necessary to evaluate the factorial invariance of the instrument’s scales across the groups of interest. These invariance analyses are presented in the following sections for the three self-concept scales.

Evaluation of Structural Similarities and Differences across Gender, Grade, and Region for Self-Concept

Tests of Invariance for the SDQII-S

Overview Hypothesis 3.4: Factorial invariance of the SDQII-S academic scales across PNG groups. In Chapter 4, it was hypothesised (Hypothesis 3.4) that the factor structure of the three academic self-concept
scales would be invariant across gender, grade, and region groups. Thus, invariance testing was performed on the SDQII-S examining whether the three-factor model of self-concept would be structurally invariant across these groups.

**Results Hypothesis 3.4: Factorial invariance of the SDQII-S academic scales across PNG groups.** A series of five invariance tests were performed across the three groups of gender, grade, and region in PNG. The goodness-of-fit indices for these models are displayed in Tables 6.31, 6.32, and 6.33.

Table 6.31. *Invariance Tests across Gender for the Three-Factor SDQII-S Model of Self-Concept*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>317.96</td>
<td>102</td>
<td>.959</td>
<td>.947</td>
<td>.0701</td>
</tr>
<tr>
<td>FL</td>
<td>383.96</td>
<td>111</td>
<td>.950</td>
<td>.940</td>
<td>.0756</td>
</tr>
<tr>
<td>FL, FC</td>
<td>403.81</td>
<td>117</td>
<td>.948</td>
<td>.941</td>
<td>.0755</td>
</tr>
<tr>
<td>FL, UN</td>
<td>454.80</td>
<td>123</td>
<td>.939</td>
<td>.935</td>
<td>.0792</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>477.04</td>
<td>129</td>
<td>.937</td>
<td>.936</td>
<td>.0792</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*
Table 6.32. *Invariance Tests across Grade for the Three-Factor SDQII-S Model of Self-Concept*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
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<td>.964</td>
<td>.954</td>
<td>.0670</td>
</tr>
<tr>
<td>FL</td>
<td>321.47</td>
<td>111</td>
<td>.963</td>
<td>.956</td>
<td>.0664</td>
</tr>
<tr>
<td>FL, FC</td>
<td>356.46</td>
<td>117</td>
<td>.957</td>
<td>.951</td>
<td>.0690</td>
</tr>
<tr>
<td>FL, UN</td>
<td>400.01</td>
<td>123</td>
<td>.956</td>
<td>.953</td>
<td>.0724</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>426.96</td>
<td>129</td>
<td>.951</td>
<td>.950</td>
<td>.0733</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

Table 6.33. *Invariance Tests across Region for the Three-Factor SDQII-S Model of Self-Concept*

<table>
<thead>
<tr>
<th>Model</th>
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<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>428.40</td>
<td>153</td>
<td>.950</td>
<td>.936</td>
<td>.0795</td>
</tr>
<tr>
<td>FL</td>
<td>468.93</td>
<td>171</td>
<td>.946</td>
<td>.938</td>
<td>.0782</td>
</tr>
<tr>
<td>FL, FC</td>
<td>511.74</td>
<td>183</td>
<td>.940</td>
<td>.935</td>
<td>.0794</td>
</tr>
<tr>
<td>FL, UN</td>
<td>542.61</td>
<td>195</td>
<td>.937</td>
<td>.936</td>
<td>.0791</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>582.69</td>
<td>207</td>
<td>.931</td>
<td>.934</td>
<td>.0798</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

As can be seen in the tables, the SDQII-S was fully invariant across gender, grade, and region, at least according to the RMSEA criteria, since this statistic did not exceed .08 for all analyses. Furthermore, for each of the analyses,
the RMSEA criteria did not change more than .01 across the five invariance models. Thus, the instrument was deemed invariant across gender, grade, and region. Thus, according to the RMSEA criteria, the SDQII-S measure was successful in obtaining the illusive factorial invariance across all levels of invariance constraints for use in PNG.

**Conclusion Hypothesis 3.4: Factorial invariance of the SDQII-S academic scales across PNG groups.** Therefore, since the model achieved complete factorial invariance, the hypothesis that the SDQII-S would be invariant across all three groups, was supported. It is now possible to examine the differences in student academic self-concept across these groups and analyses examining these differences are presented in the following sections.

**Evaluation of Similarities and Differences in Nature across Gender, Grade, and Region for Self-Concept**

**SDQII-S MIMIC Results**

**Overview Research Question 4.4: Gender, grade, and interaction differences for the SDQII-S.** Research questions 4.4a-c asked whether there are gender and grade main effects and a gender by grade interaction effect for the three scales of academic self-concept. MIMIC models were conducted to ascertain if there were any gender, grade, or region differences in students’ responses to the three academic self-concept scales.

**Results Research Question 4.4: Gender, grade, and interaction differences for the SDQII-S.** MIMIC models were conducted for the combined region group as well as separately for rural, urban, and village groups, and they examined gender and grade main effects and gender x grade interaction effects.
on the three self-concept factors. The goodness-of-fit indices for these models are displayed in Table 6.34 and the beta coefficients are displayed in Table 6.35. As can be seen by the goodness-of-fit indices each of the models demonstrated an acceptable fit with the data across all sample groups. Therefore, significant main effects and interactions were examined and are discussed in the following sections.

Table 6.34. Goodness-of-fit Indices for Overall, Urban, Rural, and Village SDQII-S MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>340.60</td>
<td>78</td>
<td>.96</td>
<td>.95</td>
<td>.063</td>
</tr>
<tr>
<td>Urban</td>
<td>180.65</td>
<td>78</td>
<td>.94</td>
<td>.92</td>
<td>.068</td>
</tr>
<tr>
<td>Rural</td>
<td>222.35</td>
<td>78</td>
<td>.96</td>
<td>.95</td>
<td>.065</td>
</tr>
<tr>
<td>Village</td>
<td>133.11</td>
<td>78</td>
<td>.94</td>
<td>.92</td>
<td>.076</td>
</tr>
</tbody>
</table>
Table 6.35. Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for Academic Self-Concept Factors for the Overall, Urban, Rural, and Village Samples

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender x Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>.03</td>
<td>-.13</td>
<td>-.04</td>
<td>.03</td>
</tr>
<tr>
<td>English</td>
<td>.20*</td>
<td>-.27*</td>
<td>.20</td>
<td>.09</td>
</tr>
<tr>
<td>Maths</td>
<td>-.10*</td>
<td>-.07</td>
<td>-.11</td>
<td>-.32</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01**
Results and conclusions for Research question 4.4a: Gender differences for the SDQII-S academic scales. Research question 4.4a asked whether there were any differences across gender on the three factors of academic self-concept. Significant main effects were only found for the overall sample. There were no significant findings for the separate rural, urban, and village groups.

For the overall sample, females scored significantly higher than males in English self-concept, and males scored significantly higher than females in mathematics self-concept. These findings are consistent with prior literature that has examined the effects of gender upon academic self-concept. Typically, past studies have found the same pattern of relations between gender and self-concept as was found in the present study, that is, that males have higher mathematics self-concept and females have higher English or verbal self-concepts (Marsh, 1989, 1993; Eccles, et al., 1993; Watt, 2004). There was no significant main effect of gender for general academic self-concept.

Results and conclusions for Research question 4.4b: Grade differences for the SDQII-S academic scales. Research question 4.4b asked whether there would be any differences in students’ responses to the SDQII-S across grade levels. Again, significant main effects for grade (like gender) were only found for the overall sample. Furthermore, the only significant main effect was found for English self-concept whereby as students’ grade levels increased, their English self-concept decreased. The findings of decreased self-concept levels over time are consistent with some self-concept research. For example, some evidence suggests that self-concept declines when children reach middle childhood, and that this decline continues through a student’s adolescence where it levels out,
and increases again throughout adulthood (Craven, Marsh, & McInerney, 2000). Other research emphasises the importance of examining a student’s self-concept within the context of its relation to their external academic environments (Wigfield & Karparthian, 1991). This latter explanation is particularly pertinent to the finding that students’ levels of English self-concept decrease over time. In a culture where English is the official language of instruction and where another eight-hundred languages (plus dialects) exist, it is likely that students’ understanding and grasp of complicated English content and material will become increasingly difficult. These results and suggestions for interventions will be discussed in more detail in later chapters.

**Results and conclusions for Research question 4.4c: Gender x grade interaction effects for the SDQII-S academic scales.** Finally, Research question 4.4c asked whether there would be an interaction effect between gender and grade upon students’ academic self-concept. There were no significant interaction effects for the overall, urban, rural, or village samples for any of the three scales of academic self-concept.

**Section Summary**

To summarise, the SDQII-S was found to be a valid and reliable instrument for use in PNG, and the three self-concept factors were shown to be invariant in structure across gender, grade, and region groups. Furthermore, significant gender and grade main effects were found for the English and mathematics self-concept subscales. Males were found to have higher mathematics self-concepts, females had higher English self-concepts, and students’ English self-concepts decreased over time. The following and final
section examines the validity, reliability, invariance, and group differences, of a measure of self-regulation, the final psychological variable to be examined in McInerney’s revised model of student achievement.

**Self-Regulation: The Goal Orientation and Learning Strategies Survey**

The Goal Orientation and Learning Strategies Survey (GOALS-S) contains a thirty-six item scale measuring six aspects of self-regulation – elaboration, organisation, rehearsal, planning, monitoring, and regulation. This scale was examined for validity, reliability, and invariance across gender, grade, and region, and self-regulation profiles were developed for each of these three groups. The following sections outline these results for the GOALS-S.

**Evaluation of the Structure of Self-Regulation for Students in PNG**

**Factor Structure of the GOALS-S**

*Overview Hypothesis 1.5: Factor structure of the GOALS-S.* Hypothesis 1.5 stated that the GOALS-S would be a valid measure of the six subscales of self-regulation. CFA analyses were performed to test this hypothesis.

*Results Hypothesis 1.5: Factor structure of the GOALS-S.* A CFA was initially performed on the self-regulation GOALS-S scales. As outlined in the previous chapter, due to the nature of the study it was anticipated that some post-hoc adjustments would be made in order to obtain the most valid model for the PNG sample. Three items from the GOALS-S were removed due to low and negative factor loadings from the organisation, rehearsal, and monitoring factors. This thirty-three item model demonstrated a good fit with the data; however, there was evidence of high collinearity between the organisation subscale and a
number of the other subscales. This factor was therefore removed from the analysis. Next, the monitoring and regulation subscales were combined to form a single factor due to high collinearity, resulting in a final four-factor, twenty-eight item model of self-regulation. This final step was appropriate not only due to the statistical high collinearity between the two monitoring and regulation subscales, but also because the definitions of these two types of learning strategies imply that they are inherently linked (see Chapter 3). Monitoring strategies involve scanning one’s learning process and identifying areas that require problem solving and other interventions. Regulation strategies then involve implementing required interventions to areas that were identified during the monitoring phase, in order to clarify one’s learning. Therefore, the combined monitoring/regulation scale was appropriately defined as and named ‘clarification’ learning strategies. Further support for the combination of these two scales will be presented in the qualitative investigation (see Chapter 8).

After the clarification scale was formed, analyses were conducted to examine if the resulting four self-regulation scales formed the hypothesised cognitive and meta-cognitive higher order factors (see Chapter 3 for a description of these). Therefore, a higher-order CFA was conducted, forcing the elaboration and rehearsal factors to load on a cognitive higher-order factor, and the clarification and planning factors to load on a meta-cognitive higher-order factor. Whilst goodness-of-fit indices were acceptable, the correlation between the cognitive and meta-cognitive higher-order factors was extremely high ($r=1.01$) suggesting that the PNG students were not distinguishing between the two higher-order factors. Therefore, the four-factor first-order model, not the two-factor higher-order model, was used for all remaining analyses. The goodness-of
fit indices for the four-factor model were good and are displayed in Table 6.36. Again, parameter estimates were examined and the factor loadings of the twenty-eight items on the first-order factors ranged from .39 to .65. They are displayed in Table 6.37.

Table 6.36. Goodness-of-fit Indices for GOALS-S First-Order CFAs

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Order CFA</td>
<td>1196.85</td>
<td>344</td>
<td>.97</td>
<td>.98</td>
<td>.054</td>
</tr>
</tbody>
</table>

Table 6.37. Factor Loadings for the Four Subscales of the GOALS-S

<table>
<thead>
<tr>
<th>Item</th>
<th>Elaboration</th>
<th>Rehearsal</th>
<th>Clarification</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>.56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E2</td>
<td>.58</td>
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<tr>
<td>E3</td>
<td>.57</td>
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<td>E4</td>
<td>.57</td>
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<tr>
<td>E5</td>
<td>.59</td>
<td></td>
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<tr>
<td>E6</td>
<td>.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>.53</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>R3</td>
<td>.62</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>R4</td>
<td>.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>.58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Conclusions Hypothesis 1.5: Factor structure of the GOALS-S

In summary, the analyses did not find support for the hypothesised six-factor model of self-regulation in PNG. The organisation subscale was removed from the analysis and the monitoring and regulating subscales were not distinguished by the PNG students. These two subscales, however, were combined on the basis of previous theory, to form a single clarification subscale, whereby students

<table>
<thead>
<tr>
<th>Item</th>
<th>Elaboration</th>
<th>Rehearsal</th>
<th>Clarification</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td></td>
<td></td>
<td>.52</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td></td>
<td>.53</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td></td>
<td></td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td></td>
<td></td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td></td>
<td></td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td></td>
<td></td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td></td>
<td></td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>C8</td>
<td></td>
<td></td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>C9</td>
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<td></td>
<td>.54</td>
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<td>C10</td>
<td></td>
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<td>C11</td>
<td></td>
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<tr>
<td>P1</td>
<td></td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>P2</td>
<td></td>
<td></td>
<td></td>
<td>.58</td>
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<tr>
<td>P3</td>
<td></td>
<td></td>
<td></td>
<td>.54</td>
</tr>
<tr>
<td>P4</td>
<td></td>
<td></td>
<td></td>
<td>.62</td>
</tr>
<tr>
<td>P5</td>
<td></td>
<td></td>
<td></td>
<td>.56</td>
</tr>
<tr>
<td>P6</td>
<td></td>
<td></td>
<td></td>
<td>.57</td>
</tr>
</tbody>
</table>
simultaneously endorse both the monitoring and problem identification and the regulation and problem solving phase of their learning. These results suggest that the nature of self-regulation might be more problematic to measure in the PNG context than some of the other dimensions represented in McInerney’s model, such as motivation and self-concept. A four-factor self-regulation model, however, was deemed appropriate for use in PNG and will be utilised for all further analyses involving self-regulation.

Reliability of the GOALS-S

Overview Hypothesis 2.5: Reliability of the GOALS-S. Hypothesis 2.5 predicted that the six original self-regulation subscales would be reliable measures of learning processes. Since the previous analyses suggested that only a four-factor model of self-regulation was relevant for use in PNG, reliability analyses were only performed using this four-factor model, to test this hypothesis.

Results Hypothesis 2.5: Reliability of the GOALS-S. Four reliability analyses were conducted to obtain Cronbach’s alphas for the four self-regulation subscales. These alphas in order were .79, .76, .82, and .70 for the elaboration, rehearsal, clarification, and planning scales. These reliability estimates were deemed to be good.

Conclusions Hypothesis 2.5: Reliability of the GOALS-S. Hypothesis 2.5 stated that the scales of the GOALS-S would be reliable measures of the six facets of self-regulation. This hypothesis was only partially supported. That is, the reliability estimates of four subscales only were examined and these scales were all found to be acceptable for use amongst PNG students.
Tests of Invariance for the GOALS-S

Next, invariance testing was performed on the four-factor self-regulation model to determine if this structure was consistent across gender, grade, and region.

Overview Hypothesis 3.5: Factorial invariance of the GOALS-S across PNG groups. Although it was stated in Hypothesis 3.5 that the six-factor model would be examined for invariance, since only the four-factor model of self-regulation was appropriate for use in PNG, it was this latter model that was examined for invariance. Thus, analyses were performed to determine if this four-factor model of self-regulation was invariant across gender, grade, and region in PNG.

Results Hypothesis 3.5: Factorial invariance of the GOALS-S across PNG groups. Three invariance models were conducted to determine if the four-factor model of self-regulation was invariant across gender, grade, and regional groups in PNG. The goodness-of-fit indices for these models are displayed in Tables 6.38, 6.39, and 6.40 for these three groups. As can be seen in the tables, the four subscales of the GOALS-S were fully invariant across gender; however, for grade and region the structure was only invariant across factor loadings and factor correlations. This still, however, meets the minimum requirement for invariance.
### Table 6.38. Invariance Tests across Gender for the Four-Factor GOALS-S Model of Self-Regulation

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>1677.54</td>
<td>688</td>
<td>.968</td>
<td>.965</td>
<td>.0578</td>
</tr>
<tr>
<td>FL</td>
<td>1707.49</td>
<td>712</td>
<td>.968</td>
<td>.966</td>
<td>.0570</td>
</tr>
<tr>
<td>FL, FC</td>
<td>1720.81</td>
<td>722</td>
<td>.968</td>
<td>.966</td>
<td>.0567</td>
</tr>
<tr>
<td>FL, UN</td>
<td>1761.94</td>
<td>740</td>
<td>.967</td>
<td>.967</td>
<td>.0566</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>1784.41</td>
<td>750</td>
<td>.967</td>
<td>.967</td>
<td>.0566</td>
</tr>
</tbody>
</table>

**Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.**

### Table 6.39. Invariance Tests across Grade for the Four-Factor GOALS-S Model of Self-Regulation

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
<td>1791.82</td>
<td>688</td>
<td>.964</td>
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<td>.0611</td>
</tr>
<tr>
<td>FL</td>
<td>1826.38</td>
<td>712</td>
<td>.964</td>
<td>.962</td>
<td>.0604</td>
</tr>
<tr>
<td>FL, FC</td>
<td>1888.84</td>
<td>722</td>
<td>.962</td>
<td>.961</td>
<td>.0613</td>
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<tr>
<td>FL, UN</td>
<td>2432.68</td>
<td>740</td>
<td>.950</td>
<td>.949</td>
<td>.0730</td>
</tr>
<tr>
<td>FL, FC, UN</td>
<td>2512.15</td>
<td>750</td>
<td>.949</td>
<td>.948</td>
<td>.0740</td>
</tr>
</tbody>
</table>

**Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.**
Table 6.40. *Invariance Tests across Region for the Four-Factor GOALS-S Model of Self-Regulation*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO INV</td>
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<td>.958</td>
<td>.954</td>
<td>.0632</td>
</tr>
<tr>
<td>FL</td>
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<td>1082</td>
<td>.958</td>
<td>.956</td>
<td>.0642</td>
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<tr>
<td>FL, FC</td>
<td>2430.46</td>
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<td>.956</td>
<td>.955</td>
<td>.0651</td>
</tr>
<tr>
<td>FL, UN</td>
<td>3698.10</td>
<td>1136</td>
<td>.932</td>
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<td>.0890</td>
</tr>
<tr>
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<td>3809.20</td>
<td>1156</td>
<td>.930</td>
<td>.931</td>
<td>.0897</td>
</tr>
</tbody>
</table>

*Bold indicates one step before a change greater than .01 in acceptable goodness-of-fit indices.*

Conclusions Hypothesis 3.5: Factorial invariance of the GOALS-S across PNG groups. As can be seen in the results reported above, support was found for the invariance of the four-factor model of self-regulation. Since this model has been shown to be structurally invariant across these groups, it is now possible to examine the differences in self-regulation profiles across gender, grade, and region. These analyses are presented in the following section.

Evaluation of Similarities and Differences in Nature across Gender, Grade, and Region for Self-Regulation

GOALS-S MIMIC Results

Finally, MIMIC analyses were performed to examine gender, grade, and region differences in students’ responses to the four self-regulation subscales.

Overview Research question 4.5: Gender, grade, and interaction differences for the GOALS-S. Research questions 4.5a-c asked whether there are
any gender or grade main effects or gender by grade interaction effects for the self-regulation factors. Again, since only a four-factor model of self-regulation was confirmed to be valid, reliable, and invariant for use in PNG, MIMIC models were performed on the four scales only.

**Results** Research question 4.5: Gender, grade, and interaction differences for the GOALS-S. Four MIMIC models were conducted on the GOALS-S examining the gender and grade main effects and the gender by grade interaction for the four self-regulation factors across the four regional groups. The goodness-of-fit indices are displayed in Table 6.41 and the beta coefficients are displayed in Table 6.42. All goodness-of-fit indices were acceptable and any significant main effects or interaction effects are discussed in the next sections.

Table 6.41. Goodness-of-fit Indices for Overall, Urban, Rural, and Village GOALS-S MIMIC Models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1371.45</td>
<td>416</td>
<td>.97</td>
<td>.97</td>
<td>.052</td>
</tr>
<tr>
<td>Urban</td>
<td>874.35</td>
<td>416</td>
<td>.95</td>
<td>.95</td>
<td>.063</td>
</tr>
<tr>
<td>Rural</td>
<td>998.35</td>
<td>416</td>
<td>.96</td>
<td>.96</td>
<td>.056</td>
</tr>
<tr>
<td>Village</td>
<td>611.06</td>
<td>416</td>
<td>.95</td>
<td>.95</td>
<td>.062</td>
</tr>
</tbody>
</table>
Table 6.42. *Standardised Beta Coefficients for Gender, Grade, and Gender x Grade Interactions for Self-Regulation Factors for the Overall, Urban, Rural, and Village Samples*

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Urban</th>
<th>Rural</th>
<th>Village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender x Grade</td>
<td>Gender x Grade</td>
<td>Gender x Grade</td>
<td>Gender x Grade</td>
</tr>
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<td>.04</td>
<td>-.01</td>
<td>-.02</td>
</tr>
<tr>
<td>Rehearsal</td>
<td>-.01</td>
<td>.02</td>
<td>.00</td>
<td>.14</td>
</tr>
<tr>
<td>Clarification</td>
<td>.03</td>
<td>.14*</td>
<td>-.03</td>
<td>.11</td>
</tr>
<tr>
<td>Planning</td>
<td>.00</td>
<td>-.01</td>
<td>.03</td>
<td>.08</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Results and conclusions for Research question 4.5a: Gender differences for the GOALS-S. Research question 4.5a asked whether there were any differences across gender in the students’ endorsement of the four self-regulation factors. The results indicated that there were no significant differences between males and females in responses to any of the elaboration, rehearsal, clarification, or planning subscales of the GOALS-S.

Results and conclusions for Research question 4.5b: Grade differences for the GOALS-S. Research question 4.5b asked whether any grade differences were present for the four self-regulation factors. There were three significant grade main effects. For the overall sample there was a significant main effect of grade for the clarification subscale which indicated that as students’ grade levels increased, their scores on this factor also increased. For the rural sample there was a significant main effect for the rehearsal subscale. This indicated that as students’ grade increased, their levels of rehearsal endorsement significantly decreased. Furthermore, for the village group, as students’ grade increased their levels of planning significantly increased. There was no significant main effect of grade for the urban group.

Results and conclusions for Research question 4.5c: Gender x grade interaction effects for the GOALS-S. Finally, Research question 4.5c asked whether or not there was a significant interaction effect between gender and grade on self-regulation. There were no significant interaction effects for the self-regulation elaboration, rehearsal, clarification, or planning factors for any of the regional groups across PNG.
Section Summary

In summary, analyses examining the effects of gender and grade upon self-regulation across regions in PNG, only found significant differences for the influence of students’ grade level. As students’ grade levels increased, they were found to adopt clarification and planning strategies more, and rehearsal strategies less. In the following chapter, the relations between these self-regulatory processes and student academic outcomes will be examined and will highlight the importance of the findings presented in this section.

Summary

This chapter has presented the findings of analyses examining the structure and nature of PNG students’ responses to instrumentation measuring future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation. The results found all instrumentation to be appropriate for use in PNG (with some modifications for the self-regulation scales) as indicated by the CFAs and reliability analyses. Furthermore, the results showed that the ISM, the FGQ-PNG, the SDQII-S, and the GOALS-S, were all invariant across gender, grade, and region as all instrumentation met the minimum requirement of invariant factor loadings across the groups. Thus, it was deemed appropriate to perform further analyses investigating the differences in the nature of students’ endorsement of the future goal and perceived instrumentality, motivation, self-concept, and self-regulation factors across gender, grade, and region groups. The findings of MIMIC models were therefore presented, examining the main effects and interaction effects of gender and grade on the psychological variables across
regional groups in PNG. Significant main effects and interactions were highlighted and discussed. The results reported in this chapter and their implications for current and future research and practice will be discussed in Chapter 9. The following chapter will present the findings of analyses examining the structural relations between future goals, perceived instrumental value, motivation, self-concept, and self-regulation, for different student groups in PNG.
CHAPTER SEVEN
STUDY 2 RESULTS -

PREDICTORS OF THE ACADEMIC ACHIEVEMENT AND EFFORT
OF PAPUA NEW GUINEAN STUDENTS: THE RELATIONS BETWEEN
FUTURE GOALS, PERCEIVED INSTRUMENTALITY, MOTIVATION,
SELF-CONCEPT, SELF-REGULATION, AND OUTCOME VARIABLES

Introduction

As demonstrated in Chapter 6, four instruments measuring future goal
orientation and perceived instrumental value, motivational goal orientation, self-
concept, and self-regulation were found to generally be psychometrically valid
for use in cross-cultural Papua New Guinean settings. In addition to this, the
instrumentation was found to be invariant in factor structure across gender,
grade, and region, and differences between gender and grade across all
psychological variables were examined. Therefore, it is now possible to examine
the relations amongst future goals and perceived instrumentality, motivation,
self-concept, and self-regulation and between these psychological variables and
academic outcome variables.

The current chapter will examine the relations between each of these
psychological variables and predictor socio-economic variables and achievement
and effort outcome measures. Next, differences in these relations will be
examined across gender, grade, and region. Finally, the validity of a
comprehensive model examining the relations between the broad predictor
variables of socio-economic status and parental education, the psychological
variables under investigation, and student academic outcomes, will be examined.

As indicated in Chapter 3, although previous research (particularly in Western cultures) has examined many of these relations separately, rarely are they integrated and examined together. It is particularly important in cross-cultural research to examine the effects of a broad range of both socio-economic and psychological influences on outcomes. The current study is unique not only due to the remote cross-cultural setting of PNG, but because the study will investigate the relations between a much larger number and broader nature of predictor variables.

Therefore, the current study will conduct the following analyses:

(a) Separate path analyses examining the individual relations between the socio-economic variables, individual psychological variables (future goal orientation, perceived instrumental value, motivational goal orientation, self-concept [domain specific and domain general], and self-regulation), and outcome variables (achievement and effort);

(b) Moderating structural equation analyses, via invariance testing, examining the similarities and differences in these models across gender, grade, and region;

(c) Latent interaction analyses examining the predicted interaction between future goal orientation and perceived instrumental value on outcome measures;

(d) Confirmatory factor analyses examining the relations between the latent factors measuring future goal orientation (success, authority, village), perceived instrumental value (success, authority, village), motivational
goal orientation (mastery, performance, social), self-concept (English, maths, general), and self-regulation (elaboration, rehearsal, clarification, planning), and outcome measures (achievement, effort); and (e) A series of comprehensive structural equation models examining the predictive relations between socio-economic status, parental education, future goal orientation, perceived instrumental value, motivational goal orientation, self-concept, self-regulation, and outcome variables.

**Building the Model: Individual Relations between Socio-economic Variables, Psychological Variables, and Outcome Measures**

In order to examine the predictive relations between the socio-economic variables, the psychological variables, and the outcome measures, structural equation modelling (SEM) was performed. As described in Chapter 5, SEM: (a) examines the causal relationships between latent factors where relations are tested through multiple regression analyses; (b) incorporates both the structural relations between latent variables as well as the observed variables; and (c) accounts for the error variance of all variables. The following section presents the results of the smaller, individual SEMs examining the relations between the latent factors of each of the psychological variables of interest and achievement and effort outcome measures. These analyses were conducted in order to identify the key positive and negative predictors of PNG students’ academic outcomes. The most important facets of future goals, instrumentality, motivation, self-regulation, self-concept, and socio-economic variables, for influencing educational outcomes, will be identified in the following analyses.
Future Goal Orientation

Achievement SEMs

Overview of Research question 1.1: Relations between future goal orientation, socio-economic variables, and student achievement. In Chapter 4, Research question 1.1 posed what the relations were between the socio-economic variables, future goal orientation, and achievement. Therefore, a SEM was tested to examine the relations between socio-economic status, parent education, success, authority, and village future goal orientations, and English and maths achievement outcomes.

Results and conclusions for Research question 1.1: Relations between future goal orientation, socio-economic variables, and student achievement. A SEM was performed on the PNG data examining the relations between the social indicator variables, future goals, and achievement scores. This model demonstrated an acceptable fit with the data as indicated by acceptable goodness-of-fit indices (RMSEA= .07, CFI= .90, TLI= .87, Chi-square= 565.16, and df= 119). Five out of the ten socio-economic paths were significant with SES positively predicting English achievement and parent education positively predicting success goals, English achievement, and maths achievement. In addition to this, parent education negatively predicted authority goals which in turn negatively predicted both English and maths achievement. Finally, village goals had a positive relation with English achievement. The path coefficients for the future goal orientation and achievement SEM are displayed in Table 7.1.
Table 7.1. *Path Coefficients of Socio-Economic, Future Goal Orientation, and Achievement SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>SFG</th>
<th>AFG</th>
<th>VFG</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFG</td>
<td>.04</td>
<td>.16**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AFG</td>
<td>-.07</td>
<td>-.16**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VFG</td>
<td>-.04</td>
<td>.08</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENG_ACH</td>
<td>.10*</td>
<td>.16**</td>
<td>.09</td>
<td>-.33**</td>
<td>.28**</td>
</tr>
<tr>
<td>MAT_ACH</td>
<td>.03</td>
<td>.14**</td>
<td>.07</td>
<td>-.10*</td>
<td>.13</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

In addition to the relations between these variables and achievement outcomes, analyses were also performed to highlight the significant relations between socio-economic variables, future goal orientation, and student effort outcomes. These analyses are presented in the next section.

**Effort SEMs**

*Overview of Research question 1.2: Relations between future goal orientation, socio-economic variables, and student effort.* The current investigation also obtained data on the PNG students’ effort applied at school. Thus, Research question 1.2 asked what are the relations between the socio-economic variables, future goal orientation, and English and maths effort.
outcomes. A second SEM was conducted examining the paths between these variables.

**Results and conclusions for Research question 1.2: Relations between future goal orientation, socio-economic variables, and student effort.** A SEM was performed examining the relations between socio-economic status and parent education, future goal orientation, and student effort outcomes. The path coefficients are displayed in Table 7.2. The goodness of fit indices were acceptable as indicated by an RMSEA of .058, CFI of .92, TLI of .90, chi-square of 405.86, and degrees of freedom of 118. Five of the sixteen paths were significant. Socio-economic status again positively predicted English effort and parent education positively predicted success goal orientation and maths effort only. Parent education also negatively predicted authority effort; however, unlike the achievement analyses authority goals had no significant relations with maths or English effort scores. Finally, village goals were positively related to maths effort.

**Section Summary**

Thus, the major positive influences of student outcomes within the future goal orientation models were socio-economic status, parent education, and holding a village future goal orientation. Furthermore, holding an authority goal orientation contributed negatively to student achievement outcomes. As described in Chapter 3, research suggests that to gain a complete understanding of the influence of future goal orientations on student learning and achievement, one must not only examine the influence of the value of the future goals
themselves, but also the value that students place on schooling in helping them to achieve their future goals. Thus, the following sections outline the SEM results examining the relations between socio-economic indicators, perceived instrumental value variables, and student outcomes.

Table 7.2. *Path Coefficients of Socio-Economic, Future Goal Orientation, and Effort SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>SFG</th>
<th>AFG</th>
<th>VFG</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFG</td>
<td>.02</td>
<td>.17**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AFG</td>
<td>-.05</td>
<td>-.15*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VFG</td>
<td>-.06</td>
<td>.09</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENG_EFF</td>
<td>.14*</td>
<td>.10</td>
<td>-.14</td>
<td>-.04</td>
<td>.19</td>
</tr>
<tr>
<td>MAT_EFF</td>
<td>.00</td>
<td>.16**</td>
<td>-.09</td>
<td>-.04</td>
<td>.17*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; ENG_EFF = English effort; MAT_EFF = mathematics effort.

*Perceived Instrumental Value*

*Achievement SEMs*

*Overview of Research question 1.3: Relations between perceived instrumental value, socio-economic variables, and student achievement.*

Research question 1.3 asked what are the relations between the socio-economic variables, perceived instrumental value, and achievement. In order to answer this
Results and conclusions for Research question 1.3: Relations between perceived instrumental value, socio-economic variables, and student achievement. A SEM was performed, examining the relations between the socio-economic variables, perceived instrumental value, and student achievement. This model demonstrated an acceptable fit with the data (RMSEA= .084, CFI= .93, TLI= .91, Chi-square= 776.23, df= 119) and the majority of the paths were consistent with the results for the matching three future goal orientation categories. Socio-economic status positively predicted English achievement, and parent education positively predicted success instrumental value, and both English and maths achievement. Parent education also negatively predicted authority instrumental value which in turn negatively predicted English and maths achievement. Finally, village instrumental value positively predicted maths achievement. These path coefficients are displayed in Table 7.3.

Next, the analyses examining the relations between the socio-economic variables, perceived instrumental value, and student effort outcomes are examined.
Table 7.3. Path Coefficients of Socio-Economic, Perceived Instrumental Value, and Achievement SEM

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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; SIV = success perceived instrumental value; AIV = authority perceived instrumental value; VIV = village perceived instrumental value; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

**Effort SEMs**

Overview of Research question 1.4: Relations between perceived instrumental value, socio-economic variables, and student effort. Research question 1.4 asked what the relations would be between socio-economic status, perceived instrumental value, and effort outcomes. To examine these relations a SEM was conducted.

Results and conclusions for Research question 1.4: Relations between perceived instrumental value, socio-economic variables, and student effort. A SEM examining the relations between the socio-economic variables, perceived instrumental value and effort demonstrated an acceptable fit with the data (RMSEA = .077, CFI = .94, TLI = .92, Chi-square = 666.13, df = 118). The path
coefficients between these variables are displayed in Table 7.4. Parent education
was positively related to success instrumental value and maths effort and
negatively related to authority instrumental value. Authority instrumental value
was negatively related to maths effort, whilst village perceived instrumental
value was positively related with it.

Table 7.4. Path Coefficients of Socio-Economic, Perceived Instrumental Value,
and Effort SEM

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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; SIV = success perceived instrumental value; AFG = authority perceived instrumental value; VFG = village perceived instrumental value; ENG_EFF = English effort; MAT_EFF = mathematics effort.

Section Summary

As can be seen, the relations between the socio-economic variables,
perceived instrumental value, and the outcome measures were generally
consistent with those found for the success, authority, and village future goal
orientation relations. It has, however, been suggested that there is an interaction between future goal orientation and perceived instrumental value of schooling that ultimately influences student achievement and effort outcomes. This interaction will be explored in more detail later in the chapter.

The next psychological variable that influences student academic outcomes in McInerney’s revised model of student achievement is motivational goal orientation. Thus, the relations between students’ immediate motivational achievement goals and their academic outcomes will be examined in the following sections.

Motivational Goal Orientation

Achievement SEMs

Overview of Research question and Hypothesis 1.5: Relations between motivational orientation, socio-economic variables, and student achievement.

Research question and hypothesis 1.5 asked what the relations are between the socio-economic predictors, the first- and higher-order motivation variables, and achievement. It predicted that there would be positive relations between mastery goals and achievement, but negative relations between performance goals and achievement. Therefore, two SEMs were conducted examining these relations for the first- and higher-order models of motivation.

Results and conclusions for Research question and Hypothesis 1.5: Relations between motivational orientation, socio-economic variables, and student achievement. The higher-order motivation model was examined first, and the paths between the socio-economic variables and mastery, performance,
and social goal orientations were examined in a SEM predicting English and maths achievement. This model demonstrated a good fit with the data (RMSEA= .058, CFI= .92, TLI=.92, Chi-square= 2327.34, and df= 641). Socio-economic status was positively related to English achievement and parent education was positively related to both English and maths achievement. Parent education was also negatively related to performance goal orientation. Upon examining the paths between motivation and achievement it was found that only mastery and performance goal paths were significant, with mastery goals being positively related to both English and maths achievement (as predicted) and performance goals being negatively related to English and maths achievement (as predicted). Social goal paths were not significant. Path coefficients are displayed in Table 7.5.

Table 7.5. Path Coefficients of Socio-Economic, Higher-Order Motivation, and Achievement SEM

<table>
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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; MAS = mastery; PER = performance; SOC = social; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.
Next, a second SEM was conducted examining the relations between the socio-economic variables, the eight first-order motivation variables, and student achievement scores. This model also demonstrated a good fit with the data (RMSEA = .060, CFI = .92, TLI = .91, Chi-square = 2367.36, df = 623) and the path coefficients are shown in Table 7.6. Eleven of the thirty-six paths were significant. Consistent with prior analyses, parent education was positively related to both English and maths achievement. It was also, however, negatively related to competition and token motivation which both form part of the performance goals’ factor.

In addition to these relations, task goals (mastery) and social concern goals (social) were both positively related to both maths and English achievement. However, social power goals (performance) negatively predicted English achievement and affiliation goals (social) negatively predicted both English and maths achievement. This first-order model of motivation therefore provides more information on the path relations between the variables of interest. Whilst in the higher-order model social goals did not significantly predict achievement, it can be seen that the combination of social concern goals and affiliation goals may be cancelling out this higher-order relation. That is, students who are socially-oriented and adopt only social concern goals are also higher achievers; however, the relation is the opposite for students who adopt social affiliation goals. Additionally, for mastery goals it can be seen that it is only the task mastery goals that are positively related to achievement, not the effort goals. Furthermore, although performance goals were negatively related to achievement
in the higher-order model, it can be seen that the majority of this negative relation can be attributed to social power goals. Implications of these findings and suggestions for educational interventions will be discussed in Chapter 9.

Table 7.6. Path Coefficients of Socio-Economic, First-Order Motivation, and Achievement SEM

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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; Task = task; Effort = effort; Comp = competition; Power = social power; Praise = praise; Token = token; Affil = affiliation; Conc = social concern; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

In addition to the first- and higher-order motivation models for student achievement outcomes, analyses were also performed examining the influences of motivation on student effort outcomes. The results of these analyses are presented in the following section.
**Effort SEMs**

*Overview of Research question and Hypothesis 1.6: Relations between motivational orientation, socio-economic variables, and student effort.*

Research question 1.6 asked what the relations were between the socio-economic variables, the first- and higher-order motivation factors, and English and maths effort outcomes. It was again anticipated that mastery goals would be positively related to effort outcomes, whilst performance goals are negatively related to effort. Thus, two SEMS were performed to examine these relations.

*Results and conclusions for Research question and Hypothesis 1.6: Relations between motivational orientation, socio-economic variables, and student effort.*

The first SEM performed examined the higher-order motivation model and demonstrated a good fit with the data (RMSEA= .057, CFI= .93, TLI= .92, Chi-square= 2245.08, df= 641). Six of the sixteen paths were significant and all path coefficients are displayed in Table 7.7.

As can be seen in the table, socio-economic status was positively related to English effort and parent education was positively related to maths effort. Parent education was also negatively related to performance goals. Consistent with the achievement analyses and in line with the hypotheses, mastery goals were positively related to both English and maths effort, however, performance goals were only negatively related to maths effort.
Table 7.7. Path Coefficients of Socio-Economic, Higher-Order Motivation, and Effort SEM

<table>
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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; MAS = mastery; PER = performance; SOC = social; ENG_EFF = English effort; MAT_EFF = mathematics effort.

Next, the first-order motivation SEM was performed for student effort outcome measures and this model also demonstrated an acceptable fit with the data (RMSEA = .059, CFI = .92, TLI = .91. Chi-square = 2316.55, df = 623). Only four of the paths coefficients were significant in this model, but all are displayed in Table 7.8.

Parent education positively predicted maths effort and negatively predicted both competition goals and token goals. Praise goals were the only motivational goal paths that reached significance and these were negatively related to maths effort. All other non-significant relations were generally in consistent directions with the achievement model and logical expectations. The findings from this current PNG investigation will be related to previous research in Western and other cross-cultural settings in Chapter 9.
Table 7.8. *Path Coefficients of Socio-Economic, First-Order Motivation, and Effort SEM*

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*p<.05, **p<.01

*Note: SES = socio-economic status; PE = parent education; Task = task; Effort = effort; Comp = competition; Power = social power; Praise = praise; Token = token; Affil = affiliation; Conc = social concern; ENG = English effort; MAT = mathematics effort.*

**Section Summary**

To summarise, results from the two higher-order motivation models indicated that in general, mastery goals were positive influences of student outcomes, whilst performance goals were negative predictors of them, and social goals had no significant relation with student achievement or effort.

However, the first-order motivation models revealed more information. It was found that the positive relation between mastery goals and achievement was
attributable to task goal orientations, and that the negative relation between performance goals and achievement and effort outcomes were attributed to social power and praise goals respectively. Furthermore, it was found that the two types of social goals – concern and affiliation – had opposite influences on student achievement. Social concern goals positively predicted achievement outcomes whilst affiliation goals negatively predicted them. These results are consistent with some past research (outlined in Chapter 3) and will be discussed in more detail in the following chapters. The next section examines the relations between socio-economic factors, students’ English, math, and general self-concept, and their achievement and effort outcomes.

**Self-Concept**

*Achievement SEMs*

**Overview of Hypothesis 1.7a: Relations between self-concept, socio-economic variables, and student achievement.** Hypothesis 1.7a predicted that there would be significant relations between the socio-economic variables, the three self-concept factors, and student achievement. A SEM was conducted to examine these relations.

**Results and conclusions for Hypothesis 1.7a: Relations between self-concept, socio-economic variables, and student achievement.** A SEM was conducted examining the relations between self-concept, the socio-economic predictors, and achievement, and it had a good fit with the data (RMSEA= .068, CFI= .94, TLI= .92, Chi-square= 472.86, df= 103). Seven of the sixteen paths were significant and all path coefficients are displayed in Table 7.9.
Socio-economic status positively predicted both general self-concept and English achievement, whilst parent education positively predicted English self-concept, and English and math achievement, and negatively predicted math self-concept. The only self-concept path that was significant was math self-concept which positively predicted math achievement. This is consistent with self-concept theory (Marsh, 1992),

Table 7.9. Path Coefficients of Socio-Economic, Self-Concept, and Achievement

<table>
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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

This model was also examined for student effort outcomes and the results are displayed in the following section.
Effort SEMs

Overview of Hypothesis 1.8a: Relations between self-concept, socio-economic variables, and student effort. Hypothesis 1.8a hypothesised that there would be relations between the socio-economic variables, self-concept, and student effort outcomes. A SEM was conducted to examine these relations for the three-factor model of self-concept.

Results and conclusions for Hypothesis 1.8a: Relations between self-concept, socio-economic variables, and student effort. The SEM conducted to examine these relations demonstrated an excellent fit with the data as indicated by an RMSEA of .049, a CFI of .96, a TLI of .95, a Chi-square statistic of 294.62 and degrees of freedom of 102. Five of the paths were significant and all are displayed in Table 7.10.

Socio-economic status positively predicted general self-concept and parent education was positively related to math effort and English self-concept, but negatively related to math self-concept. For the self-concept paths, only English self-concept was positively and significantly related to English effort.

It has, however, been suggested that self-concept should be examined within domain specific and domain general frameworks. Therefore, the following two sections outline the domain-specific and domain-general models of self-concept and their relations with socio-economic variables and achievement and effort outcomes.
Table 7.10. Path Coefficients of Socio-Economic, Self-Concept, and Effort SEM

<table>
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</tr>
<tr>
<td>GSC</td>
<td>.16**</td>
<td>-.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENG_EFF</td>
<td>.13*</td>
<td>.08</td>
<td>.27**</td>
<td>.15</td>
<td>-.20</td>
</tr>
<tr>
<td>MAT_EFF</td>
<td>-.03</td>
<td>.19**</td>
<td>-.11</td>
<td>.07</td>
<td>.15</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ENG_EFF = English effort; MAT_EFF = mathematics effort.

Domain-Specific Self-Concept

Achievement SEMs

Overview of Hypothesis 1.7b: Relations between domain-specific self-concept, socio-economic variables, and student achievement. Hypothesis 1.7b predicted relations between the domain-specific facets of self-concept (English and math only) and domain-specific achievement, and a SEM was performed to examine these relations.

Results and conclusions for Hypothesis 1.7b: Relations between domain-specific self-concept, socio-economic variables, and student achievement. The SEM performed demonstrated a good fit with the data (RMSEA= .062, CFI=.95, TLI=.93, Chi-square= 263.35, df= 66) and six of the twelve model paths were significant. Parent education was positively related to
English self-concept and English and math achievement, but negatively related to math self-concept. The two significant self-concept paths were for math self-concept only, which was positively related to math achievement and negatively (although this relation was small) related to English achievement. All path coefficients are displayed in Table 7.11.

The next section displays the results for the domain specific self-concept and effort model.

Table 7.11. Path Coefficients of Socio-Economic, Domain-Specific Self-Concept, and Achievement SEM

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>ESC</th>
<th>MSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC</td>
<td>.07</td>
<td>.14*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MSC</td>
<td>.04</td>
<td>-.14*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENG_ACH</td>
<td>.09</td>
<td>.22**</td>
<td>.04</td>
<td>-.08*</td>
</tr>
<tr>
<td>MAT_ACH</td>
<td>.00</td>
<td>.23**</td>
<td>-.02</td>
<td>.26**</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

Effort SEMs

Overview of Hypothesis 1.8b: Relations between domain-specific self-concept, socio-economic variables, and student effort. Hypothesis 1.8b predicted relations between the socio-economic variables, domain-specific self-
concept factors, and domain-specific effort. A SEM was again performed on these variables to examine the relations between them.

**Results and conclusions for Hypothesis 1.8b: Relations between domain-specific self-concept, socio-economic variables, and student effort.** The SEM that examined this model demonstrated an excellent fit with the data (RMSEA = .048, CFI = .96, TLI = .95, Chi-square = 187.79, df = 66) and the internal/external model of self-concept (Marsh, 1986) became evident for the relations between self-concept and effort outcomes. For the socio-economic paths there were positive relations between parent education and English self-concept and maths effort, and there was a negative relation between parent education and maths self-concept. For the domain-specific self-concept paths, English self-concept was positively related to English effort and maths self-concept was positively related to maths effort, thus demonstrating support for the internal/external model of self-concept. All paths are displayed in Table 7.12.

Table 7.12. Path Coefficients of Socio-Economic, Domain-Specific Self-Concept, and Effort SEM

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>ESC</th>
<th>MSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC</td>
<td>.07</td>
<td>.14*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MSC</td>
<td>.04</td>
<td>-.14*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ENG_EFF</td>
<td>.12</td>
<td>.08</td>
<td>.16**</td>
<td>-.03</td>
</tr>
<tr>
<td>MAT_EFF</td>
<td>-.02</td>
<td>.19**</td>
<td>-.02</td>
<td>.16**</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; ENG_EFF = English effort; MAT_EFF = mathematics effort.
Section Summary

In summary, the internal/external model only became apparent for the domain-specific effort model. However, for the domain-specific achievement model, although the influence of English self concept on effort outcomes was not significant, consistent with self-concept theory (see Chapter 3), math self-concept positively predicted math achievement and negatively predicted English achievement. The next section examines the domain-general self-concept models of student achievement and effort.

Domain-General Self-Concept

Achievement SEMs

Overview of Hypothesis 1.7c: Relations between domain-general self-concept, socio-economic variables, and student achievement. Hypothesis 1.7c predicted that there would be relations between the socio-economic variables, domain-general self-concept, and domain-general achievement, and an SEM was conducted on the data to examine these relations.

Results and conclusions for Hypothesis 1.7c: Relations between domain-general self-concept, socio-economic variables, and student achievement. The SEM conducted to examine these relations demonstrated an excellent fit with the data (RMSEA= .039, CFI= .98, TLI= .97, Chi-square= 37.35, df= 17). Three of the five paths were significant and all are displayed in Table 7.13. Socio-economic status positively predicted general academic self-concept and parent education positively predicted achievement. Also, general
academic self-concept was positively and significantly related to general achievement.

This domain-general model was also performed for student effort outcomes and the results are outlined in the following section.

Table 7.13. *Path Coefficients of Socio-Economic, Domain-General Self-Concept, and Achievement SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>GSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSC</td>
<td>.15*</td>
<td>-.01</td>
<td>-</td>
</tr>
<tr>
<td>ACH</td>
<td>.06</td>
<td>.34**</td>
<td>.11*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

*Note:* SES = socio-economic status; PE = parent education; GSC = general self-concept; ACH = achievement.

**Effort SEMs**

*Overview of Hypothesis 1.8c: Relations between domain-general self-concept, socio-economic variables, and student effort.* Next, Hypothesis 1.8c hypothesised the relations between the socio-economic variables, domain-general self-concept, and domain-general effort. A SEM was performed to examine the relations between these variables for the PNG students.

*Results and conclusions for Hypothesis 1.8c: Relations between domain-general self-concept, socio-economic variables, and student effort.* The SEM performed to examine these relations demonstrated an excellent fit with the data (RMSEA=.025, CFI=.99, TLI=.99, Chi-square=24.96, df=17). The only
significant path, however, was between socio-economic status and general self-concept. All path coefficients are displayed in Table 7.14.

Table 7.14. *Path Coefficients of Socio-Economic, Domain-General Self-Concept, and Effort SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>GSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSC</td>
<td>.15*</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>EFF</td>
<td>.15</td>
<td>.17</td>
<td>.08</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; GSC = general self-concept; EFF = effort.

Section Summary

Thus, the only significant predictors of student outcomes in the domain-general self-concept models were parent education and general self-concept, which predicted achievement only. There were no significant predictors of domain-general effort scores. The following section examines the final psychological variable in McInerney’s model of student achievement, self-regulation, and its relation to the socio-economic variables and student outcome measures.

Self-Regulation

Achievement SEMs

*Overview of Hypothesis 1.9: Relations between self-regulation, socio-economic variables, and student achievement.* Hypothesis 1.9 predicted that
there would be relations would be between the socio-economic variables, the self-regulation factors, and student achievement. Since a four-factor model of self-regulation was confirmed in Chapter 6, a SEM was performed examining the relations between the socio-economic variables, the four self-regulation variables, and student achievement outcomes.

**Results and conclusions for Hypothesis 1.9: Relations between self-regulation, socio-economic variables, and student achievement.** A SEM was conducted examining the predictive paths between these variables and demonstrated an excellent fit with the data (RMSEA = .052, CFI = .96, TLI = .96, Chi-square = 1456.88, and df = 471). Seven out of the twenty paths were significant. Socio-economic status positively predicted both clarification and planning strategies, whilst parent education predicted only English and math achievement. Furthermore, clarification strategies were positively related to both English and math achievement and planning strategies were negatively related to math achievement. All path coefficients are displayed in Table 7.15. Finally, this model was also tested for student effort outcomes, and the results are presented in the following section.

**Effort SEMs**

**Overview of Hypothesis 1.10: Relations between self-regulation, socio-economic variables, and student effort.** Hypothesis 1.10 predicted the relations between the socio-economic variables, self-regulation, and effort outcomes and a SEM was conducted to identify these relations.
Table 7.15. *Path Coefficients of Socio-Economic, Self-Regulation, and Achievement SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>ELA</th>
<th>REH</th>
<th>CLA</th>
<th>PLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA</td>
<td>.09</td>
<td>-.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REH</td>
<td>.05</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLA</td>
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<td>-.06</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PLA</td>
<td>.13*</td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG_ACH</td>
<td>.06</td>
<td>.24**</td>
<td>-.09</td>
<td>-.15</td>
<td>.66**</td>
<td>-.30</td>
</tr>
<tr>
<td>MAT_ACH</td>
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<td>.19**</td>
<td>.07</td>
<td>-.09</td>
<td>.52**</td>
<td>-.38*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG_ACH = English achievement; MAT_ACH = mathematics achievement.

Results and conclusions for Hypothesis 1.10: Relations between self-regulation, socio-economic variables, and student effort. The SEM conducted to measure these relations demonstrated an excellent fit with the data (RMSEA=.049, CFI=.97, TLI=.96, Chi-square= 1346.95, df= 471). Four of the twenty paths were significant and all paths are displayed in Table 7.16. Socio-economic status was positively related to clarification and planning learning strategies and parent education was positively related to math effort. For the self-regulation paths, there was only one, positive relation between clarification strategies and math effort.
Table 7.16. *Path Coefficients of Socio-Economic, Self-Regulation, and Effort SEM*

<table>
<thead>
<tr>
<th></th>
<th>SES</th>
<th>PE</th>
<th>ELA</th>
<th>REH</th>
<th>CLA</th>
<th>PLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELA</td>
<td>.09</td>
<td>-.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REH</td>
<td>.06</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLA</td>
<td>.13*</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLA</td>
<td>.13*</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG_EFF</td>
<td>.11</td>
<td>.11</td>
<td>-.05</td>
<td>.05</td>
<td>.24</td>
<td>-.10</td>
</tr>
<tr>
<td>MAT_EFF</td>
<td>-.02</td>
<td>.17**</td>
<td>.12</td>
<td>-.05</td>
<td>.26*</td>
<td>-.27</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

*Note: SES = socio-economic status; PE = parent education; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG_EFF = English effort; MAT_EFF = mathematics effort.*

**Section Summary**

Thus, it seems that clarification strategies are consistent positive predictors of student academic outcomes, whilst planning strategies negatively influence math achievement outcomes only. No other paths were significant in the SEM analyses conducted on students’ self-regulation scores.

**Summary**

This section reported the findings from a series of SEMs which examined the relations between the socio-economic predictor variables, the psychological variables of future goal orientation, perceived instrumental value, motivational goal orientation, self-concept (domain-specific and domain-general), and self-
regulation, and academic achievement and effort outcome variables. To summarise the significant outcome-related findings, the positive predictors of English achievement were socio-economic status, parent education, village future goal orientation, mastery, task, and social concern motivational goal orientation, and clarification learning strategies. The negative predictors of English achievement included authority future goal orientation and perceived instrumental value, performance, social power, and affiliation motivational goal orientation, and math self-concept. Significant positive predictors of math achievement were parent education, village instrumental value, mastery, task, and social concern motivation goals, math self-concept, and clarification learning strategies. Significant negative predictors of math achievement were authority future goals and perceived instrumental value, performance and affiliation motivation goals, and planning learning strategies. Significant predictors, all of which were positive, of English effort were socio-economic status, mastery goal orientation, and English self-concept. Finally, significant positive predictors of math effort included parent education, village future goals and instrumental value, mastery motivation goals, math self-concept, and clarification learning strategies, whilst the negative predictors were authority instrumental value and performance and praise motivational goals.

Once these models have been validated and significant paths have been identified, it is then possible to examine model path differences across groups of interest. The next section will examine the similarities and differences in each of the models presented above across groups of gender, grade, and region.
Similarities and Differences in Model Path Relations across Gender, Grade, and Region

In order to examine the similarities and differences in model paths across groups, moderating hypotheses were tested via invariance testing (see Holmes-Smith, in press). Such analyses test hypotheses that ask whether the direct paths between latent variables within a model differ across different levels of a group, for example, across males and females. The model paths are estimated across two or more groups simultaneously. In the first stage, the direct model paths are allowed to freely differ across the subgroups and the model parameters are estimated. In the second model, the direct paths are held to be invariant across the groups, in order to determine whether or not there are significant differences across the groups in the model parameters. If the difference in goodness-of-fit indices between the two models (i.e., between the freely estimated and the invariant models) is statistically significant then a moderating hypothesis is supported whereby the multiple groups differ across direct model paths between some latent variables in the model. If these criteria do not differ significantly then the overall combination of the direct paths within the model being tested are the same across the multiple groups.

The same criteria that were used in Chapter 6 for factor structure invariance testing will be used again here (see Cheung & Rensvold, 2002). These criteria state that a change of more than .01 in goodness-of-fit criteria is indicative of a significant difference between the freely estimated and invariant models. Therefore, a change of greater than .01 would indicate a significant difference in model paths between the groups under investigation. Furthermore,
the same goodness-of-fit criteria as outlined in Chapter 5 were also used to indicate acceptable fit levels. Due to the nature of the invariance testing across such complicated models, as long as at least one of the RMSEA, TLI, or CFI criteria were deemed to be acceptable, then the path coefficients were analysed for group similarities and differences.

The following section reports the results of these moderating hypotheses separately for each of the psychological variable models that were validated earlier.

_Future Goal Orientation Differences in Path Relations across Gender, Grade, and Region_

_Achievement Analyses_

_Overview of Research questions 2.1-2.3: Path relations of future goal orientations and achievement across gender, grade, and region._ In Chapter 4, Research Questions 2.1, 2.2, and 2.3 asked whether the model paths for the future goal orientation models differed across gender, grade, and region respectively, and what the nature of any differences detected were. Thus, invariance testing was performed on the future goal orientation model for groups of gender, grade, and region.

_Results and conclusions for Research questions 2.1-2.3: Path relations of future goal orientations and achievement across gender, grade, and region._ Invariant and free SEM models were performed for the achievement future goal orientation model across groups of gender, grade, and region, and the changes in goodness-of-fit criteria are displayed in Table 7.17.
Table 7.17. *Goodness-of-fit Criteria for Freely Estimated and Invariant Achievement Future Goal Orientation Models across Gender, Grade, and Region*

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>FREE</td>
<td>824.11</td>
<td>274</td>
<td>.870</td>
<td>.855</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>865.63</td>
<td>290</td>
<td>.868</td>
<td>.860</td>
</tr>
<tr>
<td>Grade</td>
<td>FREE</td>
<td>983.99</td>
<td>272</td>
<td>.847</td>
<td>.828</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1124.93</td>
<td>288</td>
<td>.831</td>
<td>.820</td>
</tr>
<tr>
<td>Region</td>
<td>FREE</td>
<td>1296.45</td>
<td>425</td>
<td>.789</td>
<td>.772</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1355.81</td>
<td>457</td>
<td>.781</td>
<td>.780</td>
</tr>
</tbody>
</table>

As can be seen from Table 7.17 there were no significant differences in the goodness-of-fit criteria for the invariant and free models. Therefore, there are no significant differences in the overall future goal orientation model paths across gender, grade, or region. However, for completeness, the individual model paths and significance levels are displayed in Table 7.18 for the different gender, grade, and region groups. It can be seen here that although the overall models do not differ significantly across the multiple groups, there are still a selection of individual model paths which reach significance in some groups but do not in others. For example, the positive relation between future goals and English achievement was apparent for primary students, but was not significant for the secondary students.
Table 7.18. *Direct Path Coefficients for Future Goal Orientation Achievement*  
*Model across Gender, Grade and Region*

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – SFG</td>
<td>.03</td>
<td>.06</td>
<td>-.16</td>
</tr>
<tr>
<td>SES – AFG</td>
<td>.01</td>
<td>-.17*</td>
<td>-.19</td>
</tr>
<tr>
<td>SES – VFG</td>
<td>-.05</td>
<td>-.03</td>
<td>-.05</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.07</td>
<td>.13*</td>
<td>.23*</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.03</td>
<td>.06</td>
<td>.18*</td>
</tr>
<tr>
<td>PE – SFG</td>
<td>.13</td>
<td>.20**</td>
<td>.76**</td>
</tr>
<tr>
<td>PE – AFG</td>
<td>-.13*</td>
<td>-.21**</td>
<td>-.04</td>
</tr>
<tr>
<td>PE – VFG</td>
<td>.05</td>
<td>.13</td>
<td>.55**</td>
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<td>.08</td>
<td>.33**</td>
<td>.43**</td>
</tr>
<tr>
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<td>.17**</td>
<td>.12</td>
<td>.33*</td>
</tr>
<tr>
<td>SFG – ENG</td>
<td>.09</td>
<td>.07</td>
<td>-.01</td>
</tr>
<tr>
<td>SFG – MAT</td>
<td>.09</td>
<td>.09</td>
<td>.11</td>
</tr>
<tr>
<td>AFG – ENG</td>
<td>-.32**</td>
<td>-.30**</td>
<td>-.37**</td>
</tr>
<tr>
<td>AFG – MAT</td>
<td>-.09</td>
<td>-.10</td>
<td>-.16</td>
</tr>
<tr>
<td>VFG – ENG</td>
<td>.23*</td>
<td>.32**</td>
<td>.37*</td>
</tr>
<tr>
<td>VFG – MAT</td>
<td>.03</td>
<td>.21</td>
<td>.17</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01  

*Note*: SES=socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; ENG = English achievement; MAT = mathematics achievement.
It seems that the positive influence of holding goals that are oriented towards one’s family or community positively influence achievement when one is in primary school, but has no influence when one reaches secondary school. This conclusion, however, must be interpreted with caution since the goodness-of-fit indices indicated that the overall model paths did not significantly differ across groups.

These analyses were also performed for the future goal orientation effort models, examining differences across gender, grade, and region, and are presented in the following section.

**Effort Analyses**

*Overview of Research questions 2.4-2.6: Path relations of future goal orientations and effort across gender, grade, and region.* Also in Chapter 4, Research questions 2.4, 2.5, and 2.6 asked whether the model path coefficients for the effort future goal orientation model would be similar or different across gender, grade, and region. Again, invariance testing was used to examine the differences in path relations across these three groups in PNG.

*Results and conclusions for Research questions 2.4-2.6: Path relations of future goal orientations and effort across gender, grade, and region.* A series of invariance SEM models were conducted to examine the group differences across gender, grade, and region, and the goodness-of-fit criteria for the three models are reported in Table 7.19. As shown in Table 7.19 there were no significant differences in the overall model paths for the effort future goal orientation model across gender, grade, or region.
<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>FREE</td>
<td>718.91</td>
<td>273</td>
<td>.876</td>
<td>.861</td>
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<tr>
<td></td>
<td>INV</td>
<td>738.48</td>
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<td>.876</td>
<td>.868</td>
</tr>
<tr>
<td>Grade</td>
<td>FREE</td>
<td>959.74</td>
<td>272</td>
<td>.832</td>
<td>.811</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1053.34</td>
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<td>.824</td>
<td>.813</td>
</tr>
<tr>
<td>Region</td>
<td>FREE</td>
<td>1213.75</td>
<td>424</td>
<td>.789</td>
<td>.772</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1263.89</td>
<td>456</td>
<td>.783</td>
<td>.782</td>
</tr>
</tbody>
</table>

Separate path coefficients are still displayed, however, in Table 7.20 for each of the groups. It is interesting to note that the positive relation between village goal orientation and students’ effort outcomes that was highlighted in the previous section was only occurring for the male group. This significant path dropped out for all other groups. The next section presents the invariance analyses across gender, grade, and region for the perceived instrumental value models.
Table 7.20. Direct Path Coefficients for Future Goal Orientation Effort Model across Gender, Grade, and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>SES – SFG</td>
<td>.01</td>
<td>.03</td>
<td>-.15</td>
</tr>
<tr>
<td>SES – AFG</td>
<td>.03</td>
<td>-.14</td>
<td>-.18</td>
</tr>
<tr>
<td>SES – VFG</td>
<td>-.05</td>
<td>-.06</td>
<td>-.05</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.20*</td>
<td>.06</td>
<td>.21*</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.09</td>
<td>.05</td>
<td>.13</td>
</tr>
<tr>
<td>PE – SFG</td>
<td>.13</td>
<td>.20*</td>
<td>.75**</td>
</tr>
<tr>
<td>PE – AFG</td>
<td>-.14</td>
<td>-.19+</td>
<td>-.04</td>
</tr>
<tr>
<td>PE – VFG</td>
<td>.05</td>
<td>.15</td>
<td>.55**</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>.03</td>
<td>.20</td>
<td>.16</td>
</tr>
<tr>
<td>PE – MAT</td>
<td>.23**</td>
<td>.11</td>
<td>.33*</td>
</tr>
<tr>
<td>SFG – ENG</td>
<td>-.26</td>
<td>-.09</td>
<td>-.33</td>
</tr>
<tr>
<td>SFG – MAT</td>
<td>-.24*</td>
<td>-.03</td>
<td>-.22</td>
</tr>
<tr>
<td>AFG – ENG</td>
<td>.04</td>
<td>-.13</td>
<td>-.04</td>
</tr>
<tr>
<td>AFG – MAT</td>
<td>.02</td>
<td>-.06</td>
<td>-.04</td>
</tr>
<tr>
<td>VFG – ENG</td>
<td>.37*</td>
<td>.04</td>
<td>.27</td>
</tr>
<tr>
<td>VFG – MAT</td>
<td>.27*</td>
<td>.16</td>
<td>.26</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, +p=borderline significant

Note: SES=socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; ENG = English effort; MAT = mathematics effort.
Perceived Instrumental Value Differences in Path Relations across Gender, Grade, and Region

Overview of Research questions 2.7-2.9: Path relations of perceived instrumental value and achievement across gender, grade, and region.

Research questions 2.7, 2.8, and 2.9 asked if there were differences in model paths for the perceived instrumental value achievement model across the gender, grade, and region groups, and invariance testing was employed to investigate these differences.

Results and conclusions for Research questions 2.7-2.9: Path relations of perceived instrumental value and achievement across gender, grade, and region. Invariance models were performed examining the differences in fit between a freely estimated path model and an invariant model to determine if there were differences across the groups. The goodness-of-fit indices for the gender, grade, and region invariance models are displayed in Table 7.21. As can be seen in this table, there were no significant differences across gender, grade, or region in the overall model fit of the perceived instrumental value achievement model.
Table 7.21. Goodness-of-fit Criteria for Freely Estimated and Invariant Achievement Perceived Instrumental Value Models across Gender, Grade and Region

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREE</td>
<td>941.51</td>
<td>272</td>
<td>.924</td>
<td>.915</td>
<td>.0798</td>
</tr>
<tr>
<td>INV</td>
<td>973.20</td>
<td>288</td>
<td>.923</td>
<td>.918</td>
<td>.0785</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREE</td>
<td>967.01</td>
<td>272</td>
<td>.925</td>
<td>.915</td>
<td>.0814</td>
</tr>
<tr>
<td>INV</td>
<td>1101.36</td>
<td>288</td>
<td>.917</td>
<td>.911</td>
<td>.0856</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREE</td>
<td>1222.50</td>
<td>425</td>
<td>.907</td>
<td>.900</td>
<td>.0856</td>
</tr>
<tr>
<td>INV</td>
<td>1305.21</td>
<td>457</td>
<td>.902</td>
<td>.901</td>
<td>.0851</td>
</tr>
</tbody>
</table>

The individual model paths for the perceived instrumental value achievement model are displayed in Table 7.22 separately for each of the groups across gender, grade, and region. One interesting finding to note upon examining this table is that the negative effect of authority instrumental value on achievement was consistent across all groups except for secondary students. For this group, the relation between authority instrumentality and achievement became positive. However, again it is necessary to interpret this finding with caution, since the overall model fit did not differ between the groups.

The perceived instrumental value effort model will be examined across the three groups in the following section.
Table 7.22. Direct Path Coefficients for Perceived Instrumental Value

Achievement Model across Gender, Grade and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – SIV</td>
<td>-.03</td>
<td>-.01</td>
<td>-.13</td>
</tr>
<tr>
<td>SES – AIV</td>
<td>-.01</td>
<td>-.07</td>
<td>-.17</td>
</tr>
<tr>
<td>SES – VIV</td>
<td>.04</td>
<td>-.04</td>
<td>-.08</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.06</td>
<td>.17**</td>
<td>.28**</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.03</td>
<td>.11</td>
<td>.20*</td>
</tr>
<tr>
<td>PE – SIV</td>
<td>.08</td>
<td>.18**</td>
<td>.55**</td>
</tr>
<tr>
<td>PE – AIV</td>
<td>-.09</td>
<td>-.21**</td>
<td>.01</td>
</tr>
<tr>
<td>PE – VIV</td>
<td>.06</td>
<td>.09</td>
<td>.56**</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>.08</td>
<td>.36**</td>
<td>.36**</td>
</tr>
<tr>
<td>PE – MAT</td>
<td>.11+</td>
<td>.21**</td>
<td>.26*</td>
</tr>
<tr>
<td>SIV – ENG</td>
<td>.16</td>
<td>.05</td>
<td>.46*</td>
</tr>
<tr>
<td>SIV – MAT</td>
<td>-.05</td>
<td>.09</td>
<td>.33</td>
</tr>
<tr>
<td>AIV – ENG</td>
<td>-.37**</td>
<td>-.31**</td>
<td>-.44**</td>
</tr>
<tr>
<td>AIV – MAT</td>
<td>-.29**</td>
<td>.10</td>
<td>-.29*</td>
</tr>
<tr>
<td>VIV – ENG</td>
<td>.15</td>
<td>.27</td>
<td>-.02</td>
</tr>
<tr>
<td>VIV – MAT</td>
<td>.27</td>
<td>.19</td>
<td>.06</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, +p=borderline significant

Note: SES=socio-economic status; PE = parent education; SIV = success perceived instrumental value; AIV = authority perceived instrumental value; VIV = village perceived instrumental value; ENG = English achievement; MAT = mathematics achievement.
Effort Analyses

Overview of Research questions 2.10-2.12: Path relations of perceived instrumental value and effort across gender, grade, and region. Research questions 2.10, 2.11, and 2.12 asked whether there were any differences in model paths across gender, grade, and region for the perceived instrumental value effort model.

Results and conclusions for Research questions 2.10-2.12: Path relations of perceived instrumental value and effort across gender, grade, and region. Invariance analyses were conducted for this model and a fully invariant model was compared to a model where the path coefficients were freely estimated and goodness-of-fit indices were compared. As can be seen in Table 7.23, there were no significant differences across gender, grade, or region in the overall model’s paths. The individual path coefficients, however, are displayed in Table 7.24 for each of these groups.

Table 7.23. Goodness-of-fit Criteria for Freely Estimated and Invariant Effort Perceived Instrumental Value Models across Gender, Grade, and Region

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>FREE</td>
<td>941.66</td>
<td>272</td>
<td>.920</td>
<td>.910</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>987.26</td>
<td>288</td>
<td>.918</td>
<td>.913</td>
</tr>
<tr>
<td>Grade</td>
<td>FREE</td>
<td>968.29</td>
<td>272</td>
<td>.920</td>
<td>.910</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1031.41</td>
<td>288</td>
<td>.917</td>
<td>.911</td>
</tr>
<tr>
<td>Region</td>
<td>FREE</td>
<td>1187.13</td>
<td>424</td>
<td>.907</td>
<td>.899</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>1252.33</td>
<td>456</td>
<td>.902</td>
<td>.902</td>
</tr>
</tbody>
</table>
For this model the negative influence of authority instrumental value on effort outcomes was found for only the male, secondary, and rural groups, whilst the positive influence of village instrumentality on effort outcomes was found only for the male, secondary, and urban groups. These findings will be discussed in greater detail in the following chapters.

In summary, the group invariance analyses found there to be no differences across gender, grade, and region in the overall model paths for the future goal and perceived instrumentality achievement and effort models. Some individual path differences, however, were highlighted. As mentioned earlier in the chapter, and as discussed in Chapter 3, some research has suggested that there is actually an interaction between future goal orientation and perceived instrumental value, which ultimately influences students’ academic outcomes. Thus, before the moderating analyses are presented for the motivation, self-concept, and self-regulation models, this interaction will be investigated in the following section.
Table 7.24. *Direct Path Coefficients for Perceived Instrumental Value Effort*

*Model across Gender, Grade, and Region*

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – SIV</td>
<td>-.03</td>
<td>-.01</td>
<td>-.13</td>
</tr>
<tr>
<td>SES – AIV</td>
<td>-.01</td>
<td>-.07</td>
<td>-.18</td>
</tr>
<tr>
<td>SES – VIV</td>
<td>.04</td>
<td>-.04</td>
<td>-.08</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.13</td>
<td>.12</td>
<td>.26*</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.06</td>
<td>.10</td>
<td>.16</td>
</tr>
<tr>
<td>PE – SIV</td>
<td>.08</td>
<td>.18**</td>
<td>.55**</td>
</tr>
<tr>
<td>PE – AIV</td>
<td>-.09</td>
<td>-.21**</td>
<td>.01</td>
</tr>
<tr>
<td>PE – VIV</td>
<td>.06</td>
<td>.09</td>
<td>.56**</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>.01</td>
<td>.28**</td>
<td>.09</td>
</tr>
<tr>
<td>PE – MAT</td>
<td>.09</td>
<td>.21**</td>
<td>.27*</td>
</tr>
<tr>
<td>SIV – ENG</td>
<td>.12</td>
<td>.15</td>
<td>.36</td>
</tr>
<tr>
<td>SIV – MAT</td>
<td>-.17</td>
<td>-.03</td>
<td>.16</td>
</tr>
<tr>
<td>AIV – ENG</td>
<td>-.10</td>
<td>-.09</td>
<td>-.09</td>
</tr>
<tr>
<td>AIV – MAT</td>
<td>-.30**</td>
<td>-.02</td>
<td>.04</td>
</tr>
<tr>
<td>VIV – ENG</td>
<td>.07</td>
<td>-.23</td>
<td>-.38</td>
</tr>
<tr>
<td>VIV – MAT</td>
<td>.38*</td>
<td>.09</td>
<td>-.13</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01,* p=borderline significant

*Note:* SES=socio-economic status; PE = parent education; SIV = success perceived instrumental value; AIV = authority perceived instrumental value; VIV = village perceived instrumental value; ENG = English effort; MAT = mathematics effort.
Interaction between Future Goal Orientation and Perceived Instrumental Value

In the preceding sections, the individual relations between student outcome measures and success, authority, and village goals were examined separately for future goal orientation and perceived instrumental value. It has been suggested, however, in past research (De Volder & Lens, 1982) that the significant effects on outcome measures are actually due to an interaction between future goal orientation and perceived instrumental value. More specifically, as outlined in Chapter 3, literature suggests that a high future goal orientation in combination with high perceived instrumental value, positively predicts student outcomes. Alternatively, it has been suggested that decreased future goal orientation, even in the presence of higher instrumental value, does not have a relation with student outcomes. Therefore, Research questions 2.4.1 and 2.4.2 were put forth to determine whether there would be a significant interaction between future goal orientation and perceived instrumental value in influencing achievement and effort outcomes, and what the nature of this interaction would be across success, authority, and village categories of future goals. The following section describes the results of analyses that were conducted to examine this interaction.

Since success, authority, and village future goal orientation and perceived instrumental value factors are latent variables it was necessary to conduct latent interaction analyses to answer the above research questions (see Holmes-Smith, in press; Kline, 2005; Marsh, Wen, & Hau, 2004). An interaction effect in structural equation modelling involves a relation of one variable to another that is
not uniform across the levels of a third. Latent interactions in structural equation modelling involve this same pattern of relations; however the variables under interest are not directly observed and are instead indicated by a number of observed indicator items.

When an interaction effect of observed variables is examined, product variables are created which represent the interactive effect of two variables (Kline, 2005). For example, for two observed variables, A and B, the product term AB represents the interaction effect of these variables. Then, path coefficients can be estimated examining the effect of the interaction term AB (i.e., the joint effect of A and B) on a third variable C.

Latent interaction analyses follow a similar but slightly more complicated logic. Imagine two latent variables A and B which are measured by two indicator items each, a\textsuperscript{1} and a\textsuperscript{2}, and b\textsuperscript{1} and b\textsuperscript{2} respectively. Therefore, a latent interaction factor of AB can be estimated by the interactive indicators of a\textsuperscript{1}b\textsuperscript{1}, a\textsuperscript{1}b\textsuperscript{2}, a\textsuperscript{2}b\textsuperscript{1}, and a\textsuperscript{2}b\textsuperscript{2}. This method, however, becomes more complicated for latent variables that are indicated by a large number of items.

Due to the complication created by large numbers of indicator items, Marsh, et al. (2004) examined latent interaction combinations whereby only a selection of indicator items are used to form interactive product terms for the latent interaction factor. They found that model precision is improved when the highest loading indicators from each of the latent factors are paired to form an indicator of the latent interaction effect. They also emphasised the importance of following the three rules when creating the interactive terms: (a) use all information; (b) do not re-use any information; and (c) try to use a natural match.
For the current study there were natural pairings between matching future goal items and perceived instrumental value items. Therefore, logical product terms were formed between the future goal items and the perceived instrumental value items to form interaction terms for the success, authority, and village latent interaction factors.

**Overview of Research question 3.1: Interaction of future goal orientation and perceived instrumental value in predicting outcome measures.**

Research question 3.1 asked whether there would be a significant interaction effect between future goal orientation and perceived instrumental value in predicting PNG students’ achievement and effort outcomes and what the nature of this interaction would be. Latent interaction analyses, described above, were employed to examine this interaction and the effect it had on achievement and effort scores.

**Results and conclusions for Research question 3.1: Interaction of future goal orientation and perceived instrumental value in predicting outcome measures.** A large structural equation model was tested, with the success, authority, and village future goal factors, perceived instrumental value factors, and interaction factors, all predicting English and math achievement outcomes. This model demonstrated a good fit with the data (RMSEA= .066, CFI= .96, TLI= .96, Chi-square= 3277.61, df= 714) and the path coefficients for the latent factors and latent interaction factors are shown in Table 7.25.
Table 7.25. *Latent Future Goals, Perceived Instrumental Value, and Interaction*

*Path Coefficients Predicting Achievement Outcomes*

<table>
<thead>
<tr>
<th>Future Goals Paths</th>
<th>Path Coefficients</th>
<th>Perceived Instrumental Value Paths</th>
<th>Path Coefficients</th>
<th>Interaction Paths</th>
<th>Path Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFG – ENG</td>
<td>.17</td>
<td>SIV – ENG</td>
<td>-.84*</td>
<td>SINT – ENG</td>
<td>.89*</td>
</tr>
<tr>
<td>SFG – MAT</td>
<td>.38*</td>
<td>SIV – MAT</td>
<td>-.05</td>
<td>SINT – MAT</td>
<td>-.16</td>
</tr>
<tr>
<td>AFG – ENG</td>
<td>.35*</td>
<td>AIV – ENG</td>
<td>.18</td>
<td>AINT – ENG</td>
<td>-.90**</td>
</tr>
<tr>
<td>AFG – MAT</td>
<td>.20</td>
<td>AIV – MAT</td>
<td>-.17</td>
<td>AINT – MAT</td>
<td>-.24</td>
</tr>
<tr>
<td>VFG – ENG</td>
<td>.21</td>
<td>VIV – ENG</td>
<td>-.28</td>
<td>VINT – ENG</td>
<td>.29</td>
</tr>
<tr>
<td>VFG – MAT</td>
<td>.20</td>
<td>VIV – MAT</td>
<td>.07</td>
<td>VINT – MAT</td>
<td>-.09</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; SINT = success interaction; AINT = authority interaction; VINT = village interaction; ENG = English achievement; MAT = Mathematics achievement.

As can be seen in Table 7.25 there were two significant interaction effects for success and authority factors predicting English achievement only. In order to interpret these two interactions it is necessary to write out the structural equation for the endogenous variable achievement, which takes the following form:

\[ E_{ACH} = P_{FG}(FG) + P_{IV}(IV) + P_{INT}(INT) \]

where \( P \) represents the path coefficients, \( FG \) stands for the future goal latent variable, \( IV \) is the perceived instrumental value latent factor, and \( INT \) is the interaction latent variable.
First, the success latent interaction was interpreted. Substituting the actual values of the path coefficients into the equation yields the following:

\[ E_{ACH} = .17(FG) - .84(IV) + .89(INT) \]

This equation can be rearranged so that the \( INT \) interaction term is eliminated, yielding the following equations that are algebraically identical to the one above:

\[ E_{ACH} = .17(FG) - .84(IV) + .89(FGIV) \]

\[ E_{ACH} = (.17 + .89IV)FG - .84IV \]

The term \((.17 + .89IV)\) in the equation above can now be seen as the regression coefficient for \( FG \) in the prediction of \( E_{ACH} \). Therefore, it can be seen that the \( FG \) term varies as a function of the \( IV \) term, thus reflecting an interaction between the two variables. The second term in the equation, \(-.84IV\), is analogous to an intercept, which, like the coefficient of \( FG \), also takes \( IV \) into account. Therefore, the equation shows the interactive (joint) effect of future goals (\( FG \)) and perceived instrumental value (\( IV \)) as they influence achievement (\( E_{ACH} \)).

Using this equation it is now possible to substitute various values of \( IV \) into the equation and examine the effect on the coefficients of \( FG \). Following advice from Kline (2005), three values for \( IV \) were substituted into the equation.
corresponding to +1, 0, and -1 standard deviations away from the mean. This generated the following results:

\[
\begin{align*}
+1 \ SD & \quad E_{ACH} = (0.17 + 0.89 \times 4.84)FG - 0.84 \times 4.84 \\
& \quad = 4.48FG - 4.07 \\
0 \ SD & \quad E_{ACH} = (0.17 + 0.89 \times 4.24)FG - 0.84 \times 4.24 \\
& \quad = 3.94FG - 3.56 \\
-1 \ SD & \quad E_{ACH} = (0.17 + 0.89 \times 3.64)FG - 0.84 \times 3.64 \\
& \quad = 3.41FG - 3.06
\end{align*}
\]

As can be seen from the above three equations, the regression coefficients for \(FG\) are positive and higher at higher levels of \(IV\). So, although there is still a positive (weak) relation between future goal orientation (\(FG\)) and achievement (\(E_{ACH}\)) at low levels of instrumental value (\(IV\)), this relation becomes stronger as instrumental value increases. Therefore, the higher the success perceived instrumental value, the greater the relation between success future goal orientation and English achievement.

The process above was repeated for the significant authority interaction and the following equations were generated:

\[
E_{ACH} = .35(FG) + .18(IV) - .90(FGV)
\]

\[
E_{ACH} = (.35 - .90IV)FG + .18IV
\]
Three values equivalent to +1, 0, and -1 standard deviations from the mean of authority instrumental value were inserted into the above equation yielding the following equations:

\[ E_{ACH} (+1 SD) = (0.35 - 0.90 \times 4.25)FG + 0.18 \times 4.25 = -3.48FG + 0.77 \]

\[ E_{ACH} (0 SD) = (0.35 - 0.90 \times 3.39)FG + 0.18 \times 3.39 = -2.70FG + 0.61 \]

\[ E_{ACH} (-1 SD) = (0.35 - 0.90 \times 2.53)FG + 0.18 \times 2.53 = -1.93FG + 0.46 \]

As seen from the above equations, the regression coefficient for authority future goals (FG) is negative and larger at higher levels of authority instrumental value (IV). Therefore, at higher levels of authority perceived instrumental value, the negative relation between authority future goals and English achievement is greater than at lower levels.

Next, the analyses were repeated for student effort outcomes. A SEM was performed examining the influence of the future goal, perceived instrumental value, and interaction factors on students’ English and math effort scores. This model demonstrated a good fit with the data (RMSEA= .065, CFI= .96, TLI= .96, Chi-square= 3065.59, df= 714) and the path coefficients for the latent factors and latent interaction factors are shown in Table 7.26.
Table 7.26. Latent Future Goals, Perceived Instrumental Value, and Interaction

Path Coefficients Predicting Effort Outcomes

<table>
<thead>
<tr>
<th>Future Goals Paths</th>
<th>Path Coefficients</th>
<th>Perceived Instrumental Value Paths</th>
<th>Path Coefficients</th>
<th>Interaction Paths</th>
<th>Path Coefficients</th>
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<td>SIV – ENG</td>
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<td>SFG – MAT</td>
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<td>VFG – MAT</td>
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<td>VIV – MAT</td>
<td>.04</td>
<td>VINT – MAT</td>
<td>.09</td>
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</tbody>
</table>

*p<.05, **p<.01

Note: SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; SINT = success interaction; AINT = authority interaction; VINT = village interaction; ENG = English effort; MAT = Mathematics effort.

For these analyses there was only one significant interaction effect. This was the interaction between authority future goals and perceived instrumental value, and its influence on English effort. The regression coefficients were again inserted into the equation yielding the following result:

\[ E_{EFF} = .48(FG) + .20(IV) - .77(FGIV) \]

\[ E_{EFF} = (.48 - .77IV)FG + .20IV \]
Again, three values equivalent to +1, 0, and -1 standard deviations from the mean of authority instrumental value, were inserted into the above equation yielding the following equations:

\[
+1 SD \quad E_{EFF} = (0.48 - 0.77 \times 4.25)FG + 0.20 \times 4.25
\]

\[
= -2.79FG + .85
\]

\[
0 SD \quad E_{EFF} = (0.48 - 0.77 \times 3.39)FG + 0.20 \times 3.39
\]

\[
= -2.13FG + .68
\]

\[
-1 SD \quad E_{EFF} = (0.48 - 0.77 \times 2.53)FG + 0.20 \times 2.53
\]

\[
= -1.47FG + .51
\]

Consistent with the interaction analyses for achievement outcomes, it can be seen in the above equations that the regression coefficient for authority future goals \((FG)\) is negative and larger at higher levels of authority instrumental value \((IV)\). Therefore, at higher levels of authority perceived instrumental value, the negative relation between authority future goals and English effort is greater than at lower levels.

These analyses have explored one aspect of the hypothesised interaction effect between future goal orientation and perceived instrumental value. It was found that a positive prediction of English achievement depended on the joint interactive effect of success future goals and success perceived instrumental value. That is, believing that success goals are important to one’s future, and believing that schooling will help one attain these success goals results in higher English achievement. Conversely, it was found that a negative prediction of
English achievement and English effort depended on the joint interactive effect of authority goals and authority instrumental value. That is, setting authority related goals for one’s future and believing that school can help one to achieve these goals actually results in a negative impact on English achievement and effort. No significant interaction effects were found for village goals, or for math achievement and effort.

The implications of these significant interactions will be explored in the following chapters. Our attention now, however, returns to the moderating hypotheses for the other psychological variables in McInerney’s revised model of student achievement. Next, any differences between gender, grade, and region in the motivational goal orientation models will be explored.

**Motivation Differences in Path Relations across Gender, Grade, and Region**

Achievement Analyses

*Overview of Research questions 2.13-2.15: Path relations of motivation and achievement models across gender, grade, and region.* In Chapter 4, Research questions 2.13, 2.14, and 2.15 asked whether there were any differences across gender, grade, or region in the model paths between motivational goal orientation and academic achievement. In order to answer these questions, invariance testing was again employed whereby constrained models were compared to free models to determine if there were group differences.
Results and conclusions for Research questions 2.13-2.15: Path relations of motivation and achievement models across gender, grade, and region. Invariance analyses were performed for the first-order motivation model only due to the complex nature of the higher-order motivation model and the limited sample size for some of the groups. Furthermore, for the region analyses, only urban and rural groups were compared due to the small sample size of the village group and the complexity of the model. Table 7.27 displays the goodness-of-fit indices for the constrained and free models across gender, grade, and region. As can be seen by these indices, there were no significant differences in the overall model paths across these groups. However, the individual path coefficients are still displayed in Table 7.28 for each of the groups.

Table 7.27. Goodness-of-fit Criteria for Freely Estimated and Invariant Achievement Motivation Models across Gender, Grade, and Region

<table>
<thead>
<tr>
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Table 7.28. *Direct Path Coefficients for Motivation Achievement Model across Gender, Grade, and Region*

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<th>Region</th>
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<td>.34*</td>
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</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; TAS = task; EFF = effort; COM = Competition; SP = social power; PRA = praise; TO = token; AFF = affiliation; SC = social concern; ENG = English achievement; MAT = Mathematics achievement.

Most path relations were very similar across the groups except in some cases where one group was not significant. However, in general, most path coefficients
were in the same direction across gender, grade, and region groups. This model was also tested for student effort outcomes and the results are reported in the following section.

**Effort Analyses**

*Overview of Research questions 2.16-2.18: Path relations of motivation and effort models across gender, grade, and region.* Research questions 2.16, 2.17, and 2.18 asked whether the model paths of the effort motivation model would be similar or different across gender, grade, and region. Invariance tests were performed comparing the fully invariant model with the free model in which path coefficients were freely estimated.

*Results and conclusions for Research questions 2.16-2.18: Path relations of motivation and effort models across gender, grade, and region.* The goodness-of-fit statistics for the invariance testing were compared between the two models and are displayed in Table 7.29 for gender, grade, and region analyses. As shown in this table there were no significant differences across the groups, however individual path estimates are still displayed in Table 7.30 for males and females, primary and secondary, and urban and rural groups.

As with the achievement motivation model, path relations seemed to be consistent and generally in the same direction across groups. However, any pertinent cross-group findings on the motivational goal orientation achievement and effort models will be discussed in the following chapters. The next section presents the analyses examining group similarities and differences for the self-concept achievement and effort models.
Table 7.29. Goodness-of-fit Criteria for Freely Estimated and Invariant Effort Motivation Models across Gender, Grade, and Region

<table>
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<th>RMSEA</th>
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<td>1343</td>
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Table 7.30. Direct Path Coefficients for Motivation Effort Model across Gender, Grade, and Region

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<th>Grade</th>
<th>Region</th>
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### Self-Concept Differences in Path Relations across Gender, Grade, and Region

**Achievement Analyses**

**Overview of Research questions 2.19-2.21:** Path relations of self-concept and achievement models across gender, grade, and region. Research questions 2.19, 2.20, and 2.21, asked whether the achievement model paths were similar or different across gender, grade, and region for the domain-specific and domain-general models and invariance testing was employed to examine these differences.

**Results and conclusions for Research questions 2.19-2.21:** Path relations of self-concept and achievement models across gender, grade, and region...
region. The invariant models were compared with the models in which the beta path coefficients were freely estimated. The goodness-of-fit indices examining the differences across gender, grade, and region are displayed in Tables 7.31 and 7.32 respectively for the domain-specific and domain-general self-concept models. There was a significant difference for the domain-specific model between primary and secondary student model paths. There was also a significant difference between these two groups for the domain-general model, however, the goodness-of-fit indices were not acceptable so these results must be interpreted with caution. Individual path coefficients are displayed in Tables 7.33 and 7.34 for the domain-specific and domain-general achievement models.

As indicated by the goodness-of-fit changes and as can be seen in Table 7.36 there were some differences between primary and secondary students’ model paths. The main differences were that the positive relation between parent education and English self-concept and the negative relation between parent education and maths self-concept was only present for the secondary students, and was not significant for primary students. In addition to this, for the primary students only, there were positive and significant relations between English self-concept and both English and maths achievement. While the positive relation between English self-concept and English achievement correspond to Marsh’s (1992) model of self-concept, the positive relation between English self-concept and math achievement does not. These findings will be discussed later.
Table 7.31. *Goodness-of-fit Criteria for Freely Estimated and Invariant Domain-Specific Self-Concept Achievement Models across Gender, Grade, and Region*

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Table 7.32. *Goodness-of-fit Criteria for Freely Estimated and Invariant Domain-General Self-Concept Achievement Models across Gender, Grade, and Region*

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<td><strong>Region</strong></td>
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<tr>
<td>FREE</td>
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<td>75</td>
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Table 7.33. *Direct Path Coefficients for Domain-Specific Self-Concept*

*Achievement Model across Gender, Grade, and Region*

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – ESC</td>
<td>.12</td>
<td>.04</td>
<td>-.05</td>
</tr>
<tr>
<td>SES – MSC</td>
<td>-.02</td>
<td>.13</td>
<td>-.07</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.04</td>
<td>.12</td>
<td>-.10</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.05</td>
<td>.04</td>
<td>.01</td>
</tr>
<tr>
<td>PE – ESC</td>
<td>.11</td>
<td>.11</td>
<td>.03</td>
</tr>
<tr>
<td>PE – MSC</td>
<td>-.03</td>
<td>-.33**</td>
<td>-.05</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>.14*</td>
<td>.44**</td>
<td>.89**</td>
</tr>
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<td>PE – MAT</td>
<td>.23**</td>
<td>.23**</td>
<td>.51**</td>
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<td>ESC – ENG</td>
<td>.05</td>
<td>.03</td>
<td>.28**</td>
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<td>ESC – MAT</td>
<td>-.05</td>
<td>.00</td>
<td>.18*</td>
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<td>MSC – ENG</td>
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<td>.09</td>
</tr>
<tr>
<td>MSC – MAT</td>
<td>.37**</td>
<td>.16**</td>
<td>.26**</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

*Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; ENG = English achievement; MAT = mathematics achievement.*
Table 7.34. Direct Path Coefficients for Domain-General Self-Concept Achievement Model across Gender, Grade, and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – GSC</td>
<td>.07</td>
<td>.27**</td>
<td>-.13</td>
</tr>
<tr>
<td>SES – ACH</td>
<td>-.01</td>
<td>.14</td>
<td>.22*</td>
</tr>
<tr>
<td>PE – GSC</td>
<td>.07</td>
<td>-.15</td>
<td>.16</td>
</tr>
<tr>
<td>PE – ACH</td>
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<td>.47**</td>
<td>.42**</td>
</tr>
<tr>
<td>GSC – ACH</td>
<td>.20**</td>
<td>.01</td>
<td>.19*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

*Note: SES = socio-economic status; PE = parent education; GSC = general self-concept; ACH = achievement.

These invariance tests were also performed across gender, grade, and region for the domain specific and domain general effort self-concept models. The results are displayed in the following section.

Effort Analyses

Overview of Research questions 2.22-2.24: Path relations of self-concept and effort models across gender, grade, and region. Next, Research questions 2.22, 2.23, and 2.24, asked whether there would be differences across gender, grade, and region in the model paths for the domain-specific and domain-general self-concept effort models. Invariance testing was again used and the fully invariant model was compared to the path coefficient free model to determine if there were any significant differences across the groups.
Results and conclusions for Research questions 2.22-2.24: Path relations of self-concept and effort models across gender, grade, and region.

The goodness-of-fit indices for the domain-specific and domain-general models are displayed in Tables 7.35 and 7.36 respectively. As can be seen in these tables, there were no significant differences in the overall model path coefficients across gender, grade, or region for both models. The individual path coefficients, however, are still displayed in Tables 7.37 and 7.38 for completeness.

Table 7.35. Goodness-of-fit Criteria for Freely Estimated and Invariant Domain-Specific Self-Concept Effort Models across Gender, Grade, and Region

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
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<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>FREE</td>
<td>489.32</td>
<td>159</td>
<td>.900</td>
<td>.885</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>511.83</td>
<td>171</td>
<td>.896</td>
<td>.889</td>
</tr>
<tr>
<td>Grade</td>
<td>FREE</td>
<td>367.54</td>
<td>159</td>
<td>.944</td>
<td>.936</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>402.08</td>
<td>171</td>
<td>.938</td>
<td>.934</td>
</tr>
<tr>
<td>Region</td>
<td>FREE</td>
<td>604.19</td>
<td>249</td>
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<td>.871</td>
</tr>
<tr>
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<td>INV</td>
<td>629.00</td>
<td>273</td>
<td>.880</td>
<td>.880</td>
</tr>
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</table>
Table 7.36. *Goodness-of-fit Criteria for Freely Estimated and Invariant Domain-General Self-Concept Effort Models across Gender, Grade, and Region*

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
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<th>TLI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>FREE</td>
<td>156.84</td>
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<td>.866</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>165.32</td>
<td>53</td>
<td>.882</td>
<td>.875</td>
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<tr>
<td>Grade</td>
<td>FREE</td>
<td>116.85</td>
<td>48</td>
<td>.939</td>
<td>.928</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>136.47</td>
<td>53</td>
<td>.924</td>
<td>.920</td>
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<tr>
<td>Region</td>
<td>FREE</td>
<td>166.77</td>
<td>75</td>
<td>.882</td>
<td>.868</td>
</tr>
<tr>
<td></td>
<td>INV</td>
<td>181.39</td>
<td>85</td>
<td>.871</td>
<td>.873</td>
</tr>
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</table>

It is interesting to note that the positive influences of self-concept appeared to predominantly be occurring for the male, primary, and rural groups across both the domain-specific and domain-general models. Furthermore, for the domain-specific model, it was only amongst the male group and the secondary group, that the internal/external model of self-concept was apparent. Important findings stemming from these results will be discussed in more detail in the following chapters. Finally, the invariance tests were also conducted on the self-regulation achievement and effort models. The results of these analyses are presented in the following section.
Table 7.37. Direct Path Coefficients for Domain-Specific Self-Concept Effort

Model across Gender, Grade, and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – ESC</td>
<td>.12</td>
<td>.04</td>
<td>-.07</td>
</tr>
<tr>
<td>SES – MSC</td>
<td>-.02</td>
<td>.12</td>
<td>-.08</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.15</td>
<td>.07</td>
<td>.55**</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.09</td>
<td>.05</td>
<td>.12</td>
</tr>
<tr>
<td>PE – ESC</td>
<td>.11</td>
<td>.10</td>
<td>.06</td>
</tr>
<tr>
<td>PE – MSC</td>
<td>-.03</td>
<td>-.33**</td>
<td>-.02</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>-.01</td>
<td>.20</td>
<td>-.04</td>
</tr>
<tr>
<td>PE – MAT</td>
<td>.22**</td>
<td>.15</td>
<td>.20*</td>
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<tr>
<td>ESC – ENG</td>
<td>.19**</td>
<td>.08</td>
<td>.20</td>
</tr>
<tr>
<td>ESC – MAT</td>
<td>-.03</td>
<td>-.04</td>
<td>.04</td>
</tr>
<tr>
<td>MSC – ENG</td>
<td>.07</td>
<td>.02</td>
<td>.30**</td>
</tr>
<tr>
<td>MSC – MAT</td>
<td>.29**</td>
<td>.03</td>
<td>.01</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ESC = English self-concept; MSC = mathematics self-concept; ENG = English effort; MAT = mathematics effort.
Table 7.38. *Direct Path Coefficients for Domain-General Self-Concept Effort Model across Gender, Grade, and Region*

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Primary</td>
</tr>
<tr>
<td>SES – GSC</td>
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<td>.26**</td>
<td>-.14</td>
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<tr>
<td>SES – EFF</td>
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<td>.78**</td>
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<td>PE – GSC</td>
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<td>.17</td>
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<td>PE – EFF</td>
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<td>-.03</td>
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<tr>
<td>GSC – EFF</td>
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<td>.33*</td>
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</table>

*p<.05, **p<.01, *p=borderline significant

Note: SES = socio-economic status; PE = parent education; GSC = general self-concept; EFF = effort.

**Self-Regulation Differences in Path Relations across Gender, Grade, and Region**

Achievement Analyses

*Overview of Research questions 2.25-2.27: Path relations of self-regulation and achievement models across gender, grade, and region.* In Chapter 4, Research questions 2.25, 2.26, and 2.27, asked whether there were group differences in path coefficients for the self-regulation achievement model across gender, grade, and region, and invariance testing was used to explore these differences.
Results and conclusions for Research questions 2.25-2.27: Path relations of self-regulation and achievement models across gender, grade, and region. Invariance analyses were again utilised to examine the differences between a fully invariant model, and a model where the beta path coefficients were kept free. Goodness-of-fit indices are displayed in Table 7.39. There were no significant differences across gender, grade, or region in the overall model paths; however, these individual path coefficients are still displayed in Table 7.40.

Table 7.39. Goodness-of-fit Criteria for Freely Estimated and Invariant Self-Regulation Achievement Models across Gender, Grade, and Region

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
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<th>TLI</th>
<th>RMSEA</th>
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<td>.951</td>
<td>.949</td>
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<td>1590</td>
<td>.912</td>
<td>.912</td>
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</table>
Table 7.40. Direct Path Coefficients for Self-Regulation Achievement Model across Gender, Grade, and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Females</td>
<td>Primary</td>
</tr>
<tr>
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<td>.06</td>
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<tr>
<td>SES – REH</td>
<td>.06</td>
<td>-.01</td>
<td>-.18</td>
</tr>
<tr>
<td>SES – CLA</td>
<td>.13*</td>
<td>.08</td>
<td>-.20*</td>
</tr>
<tr>
<td>SES – PLA</td>
<td>.17**</td>
<td>.03</td>
<td>-.10</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.07</td>
<td>.14*</td>
<td>.35**</td>
</tr>
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<td>SES – MAT</td>
<td>-.03</td>
<td>.05</td>
<td>.31**</td>
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<td>PE – ELA</td>
<td>-.03</td>
<td>-.02</td>
<td>.31**</td>
</tr>
<tr>
<td>PE – REH</td>
<td>-.08</td>
<td>-.07</td>
<td>.29**</td>
</tr>
<tr>
<td>PE – CLA</td>
<td>-.05</td>
<td>-.01</td>
<td>.38**</td>
</tr>
<tr>
<td>PE – PLA</td>
<td>-.07</td>
<td>.02</td>
<td>.30**</td>
</tr>
<tr>
<td>PE – ENG</td>
<td>.13*</td>
<td>.43**</td>
<td>.37**</td>
</tr>
<tr>
<td>PE – MAT</td>
<td>.15**</td>
<td>.27**</td>
<td>.28**</td>
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<td>-.43</td>
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<td>-.06</td>
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<td>REH – MAT</td>
<td>-.14</td>
<td>-.02</td>
<td>.11</td>
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<td>CLA – ENG</td>
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<td>.55**</td>
<td>.93**</td>
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### Model Path

<table>
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</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>PLA – MAT</td>
<td>-.12</td>
<td>-.75*</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.

There were generally consistencies in path coefficients across the groups; however, some differences were noted for the socio-economic variables. Socio-economic status was a positive predictor of clarification strategies for the secondary group but a negative predictor of them for the primary group. Furthermore, parent education was a positive predictor of rehearsal strategies for the primary and village groups but a negative predictor of them for the secondary group. In the next section, the invariance analyses are presented for the effort self-regulation models across the groups of gender, grade, and region.

**Effort Analyses**

*Overview of Research questions 2.28-2.30: Path relations of self-regulation and effort models across gender, grade, and region.* Finally, invariance analyses were performed on the self-regulation effort model across groups. Research questions 2.28, 2.29, and 2.30 asked whether there would be any differences across gender, grade, and region in the model paths of the self-regulation effort model, and invariance testing was utilised to test this.
Results and conclusions for Research questions 2.28-2.30: Path relations of self-regulation and effort models across gender, grade, and region.

An invariant model was compared with the path coefficient free model and the goodness-of-fit statistics are displayed in Table 7.41. There were no significant differences across the groups in the overall model paths. The individual path coefficients for gender, grade, and region are displayed in Table 7.42.

Table 7.41. Goodness-of-fit Criteria for Freely Estimated and Invariant Self-Regulation Effort Models across Gender, Grade, and Region

<table>
<thead>
<tr>
<th></th>
<th>chi-square</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
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</thead>
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<td>Gender</td>
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<td>2239.34</td>
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<td>.952</td>
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<tr>
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<td>INV</td>
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<td>1031</td>
<td>.954</td>
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<tr>
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</tbody>
</table>

Again, there were generally consistencies in the path coefficients across the groups except for some slight differences in the paths from parent education and socio-economic status to the learning strategies. However, as with all of the other analyses, these differences must be interpreted cautiously, as the overall goodness-of-fit indices indicated that there were no overall differences in the model paths across the groups of males and females, primary and secondary students, and students from urban, rural, and village regions.
Table 7.42. Direct Path Coefficients for Self-Regulation Effort Model across Gender, Grade, and Region

<table>
<thead>
<tr>
<th>Model Path</th>
<th>Gender</th>
<th>Grade</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>SES – ELA</td>
<td>.09</td>
<td>.06</td>
<td>-.11</td>
</tr>
<tr>
<td>SES – REH</td>
<td>.06</td>
<td>-.01</td>
<td>-.18</td>
</tr>
<tr>
<td>SES – CLA</td>
<td>.13*</td>
<td>.08</td>
<td>-.21*</td>
</tr>
<tr>
<td>SES – PLA</td>
<td>.17**</td>
<td>.03</td>
<td>-.10</td>
</tr>
<tr>
<td>SES – ENG</td>
<td>.10</td>
<td>.12</td>
<td>.24*</td>
</tr>
<tr>
<td>SES – MAT</td>
<td>-.04</td>
<td>.07</td>
<td>.17**</td>
</tr>
<tr>
<td>PE – ELA</td>
<td>-.03</td>
<td>-.02</td>
<td>.31**</td>
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Note: SES = socio-economic status; PE = parent education; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.

Section Summary

This section has reported the results of analyses that were conducted to examine group differences in the model paths across the various psychological variables under inspection. Invariance testing was employed to examine differences across gender, grade, and region and all individual path coefficients were presented separately for each group. In general there were no significant differences across groups when examining the overall path coefficients. However, some individual path coefficients of particular interest to the study were highlighted and will be discussed in more detail in Chapter 9. The following section examines McInerney’s revised model of student achievement for Papua New Guinean students.

McInerney’s Revised Model of Student Outcomes: Relations between Socio-Economic, Psychological, and Outcome Variables

Achievement Confirmatory Factor Analysis

In order to present a more comprehensive model of student achievement, McInerney suggested combining the socio-economic and outcome variables with
all of the psychological variables under investigation in the current study. This model suggests that it is the combined influence of socio-economic status and parent education with future goal orientation, perceived instrumental value, motivational goal orientation, self-concept, and self-regulation that ultimately influences student achievement and effort. In order examine the usefulness of this model for predicting PNG students’ academic outcomes, it is important to firstly examine the relations between all of the predictor variables in McInerney’s revised model before predictive paths are examined.

**Overview of Research question 4.1: Relations between psycho-social variables and achievement.** In Chapter 4, Research question 4.1 was put forth asking what the relations are between the socio-economic variables, psychological variables, and outcome measures measured by a comprehensive confirmatory factor analysis (CFA) In order to answer this question, a comprehensive CFA (see Chapter 5 for detailed explanation) was performed and the relations between the aforementioned variables and goodness-of-fit indices were examined.

**Results and conclusions for Research question 4.1: Relations between psycho-social variables and achievement.** The results of the comprehensive CFA indicated that the model demonstrated a good to excellent fit with the PNG data. This was indicated by an RMSEA of .040, a CFI and TLI of .96 and .95 respectively, a Chi-square statistic of 11244.38, and degrees of freedom of 5044. The correlations between the latent factors are displayed in Table 7.43. Factor loadings are not presented as they are similar to those in the separate factor analyses for each instrument reported in Chapter 6. Variables that had positive
relations with achievement were socio-economic status, parental education, success future goals and perceived instrumental value, village future goals and perceived instrumental value, mastery and social goal orientation, domain-specific English and math self-concept, and elaboration and clarification learning strategies. Variables that had negative relations with achievement were authority future goals and perceived instrumental value, and performance goal orientations.

In addition to the relations in this achievement model, a CFA was also performed examining the relations between key variables and effort outcome measures. These results are reported in the following section.
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*Note: SES = socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.
Effort Confirmatory Factor Analysis

Overview of Research question 4.2: Relations between psycho-social variables and effort. Research Question 4.2 in Chapter 4 asked what the relations between the socio-economic and psychological variables and effort outcome measures would be. In order to unearth these relations, a second comprehensive CFA was performed examining the relations between all predictor variables and English and math effort outcomes.

Results and conclusions for Research question 4.2: Relations between psycho-social variables and effort. The results of the CFA found the model to have an excellent fit with the data as indicated by an RMSEA of .039, a CFI and TLI of .96, and a Chi-square of 11103.78 and degrees of freedom 5044. The correlations between the socio-economic and psychological variables and the effort outcomes are displayed in Table 7.44. Again, factor loadings are not presented, as they are similar to those presented in Chapter 6. Variables that were positively related to effort included socio-economic status, parent education, village future goals and instrumental value, mastery motivational goals, rehearsal, domain-specific English and math self-concept, general self-concept, and clarification and planning learning strategies. Variables that were negatively related to effort were authority instrumental value and performance goal orientations.

Once the relations between the socio-economic, psychological, and outcome variables have been elucidated, it is then possible to examine the paths between these variables within a SEM. It is necessary to do this so that the unique influences of each of the psychological variables on their designated
factors can be highlighted in accordance with McInerney’s revised model of student achievement. These results are presented in the following sections.
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*p<.05, **p<.01

Note: SES = socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
McInerney’s Model of Student Outcomes: Paths between Socio-economic, Psychological, and Outcome Variables

In Chapter 4, Research questions 4.3-4.6 asked whether the hypothesised models of student outcomes would demonstrate good fit with the data and what the predictive paths would be between the socio-economic, psychological, and outcome variables. In order to answer these questions, two SEMs were performed, which although based on correlational data, allow the researcher to estimate structurally interpretable relations (total effects, direct effects, and indirect effects) between multiple independent and dependent variables (Mueller, 1996). It is important to note that since the current study is not longitudinal in nature, that is, only one time-wave of data was collected, it is not possible to identify ‘causal’ relations between the variables.

McInerney’s revised model of student outcomes was investigated by examining the goodness-of-fit indices and the predictive paths between the variables under investigation. McInerney’s model hypothesises that the causal flow of variables will be from the socio-economic variables to the future goal orientation and instrumental value variables, to the motivation variables, to the self-concept variables, and finally to the self-regulation variables, all of which predict academic outcomes. This model flow is depicted pictorially in Figure 7.1. However, it is important to note that although pictorially all of the variables are represented by higher-order factors, it is actually the second-order factors that are examined in the structural equation models. For example, self-regulation is measured by four second-order factors, namely elaboration, rehearsal, clarification, and planning.
Figure 7.1. McInerney’s Model of Student Outcomes: Higher Order

Representation of Hypothesised Full-Forward Structural Equation Model

Note: SES = socio-economic status variables; FG/IV = future goal orientation / perceived instrumental value variables; MOT = motivation variables; SC = self-concept variables; SR = self-regulation variables; OUT = achievement and effort outcome variables.

This model hypothesises a directional and ordered flow between the variables; however the model is also a full-forward model in that variables to the left of the model predict all variables to the right side of the model. The model therefore examines the causal flow of students’ socio-economic status, future goals, instrumental value, motivation, self-concept, and self-regulation as an explanation for their achievement and effort outcomes. In testing this full-forward model it becomes possible to not only examine the direct, unique effects between variables, but also the indirect effects. That is, the model proposes that the causal effects on student outcomes will flow from their socio-economic variables, through their future goal orientation and instrumental value, and their motivation, and their self-concept, and finally their self-regulation. Therefore, it is important to examine both the direct and indirect effects.
The following sections present the results of two SEMs examining the direct and indirect effects between the flow from the socio-economic variables through the psychological variables to student achievement and effort.

Achievement Structural Equation Model

Overview of Research questions 4.3-4.4: Goodness-of-fit and paths between psycho-social variables and achievement in McInerney’s Revised Model of Student Achievement. Research questions 4.3 and 4.4 asked whether McInerney’s revised model of student achievement would demonstrate an adequate fit with the PNG data, and what the key relations are between the psycho-social variables and student achievement.

Results and conclusions for Research questions 4.3-4.4: Goodness-of-fit and paths between psycho-social variables and achievement in McInerney’s Revised Model of Student Achievement. A SEM was performed examining the paths between students’ socio-economic variables, future goals and instrumental value, motivation, self-concept, self-regulation, and academic achievement. This model demonstrated a good fit with the data as indicated by an RMSEA of .047, a CFI and TLI both of .94, a Chi-square statistic of 13586.85, and degrees of freedom of 5068. The individual path relations are displayed in the following tables separately for the variables under investigation. The total, direct, and indirect effects are reported for all appropriate paths. Tables 7.45, 7.46, 7.47, 7.48, 7.49, 7.50, and 7.51 display the model paths for students’ socio-economic status, parent education, future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation respectively.
Table 7.45. Summary of Total, Direct, and Indirect Effects for Socio-Economic Status Paths

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*p<.05, **p<.01

Note: SES = socio-economic status; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.
Table 7.46. Summary of Total, Direct, and Indirect Effects for Parent Education

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* *p<.05, **p<.01

*Note: PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.*
Table 7.47. *Summary of Total, Direct, and Indirect Effects for Future Goal Orientation Paths*

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*p<.05, **p<.01

Note: SFG = success future goals; AFG = authority future goals; VFG = village future goals; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.
Table 7.48. *Summary of Total, Direct, and Indirect Effects for Perceived Instrumental Value Paths*

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*p<.05, **p<.01

Note: SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.
Table 7.49. *Summary of Total, Direct, and Indirect Effects for Motivation Paths*

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*p<.05, **p<.01, *p=borderline significant

Note: MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.

Table 7.50. Summary of Total, Direct, and Indirect Effects for Self-Concept
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*p<.05, **p<.01

Note: MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.

Table 7.51. Summary of Total, Direct, and Indirect Effects for Self-Regulation

Paths

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*p<.05, **p<.01

Note: ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English achievement; MAT = mathematics achievement.
To summarise, when the combined influences of all socio-economic and psychological variables on student achievement were examined, the following achievement results were found: (a) four variables, socio-economic status, parent education, village future goals, and mastery immediate goals, positively predicted English scores; (b) three variables, authority future goals, authority instrumental value, and performance immediate goals, negatively predicted English scores; (c) three variables, parent education, mastery immediate goals, and math self-concept, positively influenced math achievement scores; and (d) two variables, authority instrumental value and performance immediate goals, negatively influenced math outcomes.

In addition to these influences of the socio-economic and psychological variables on achievement outcomes, there were also a number of significant paths between the socio-economic variables and the psychological variables. A summary of these significant relations are displayed in Table 7.52. The implications of these significant paths will be discussed in further detail in the following chapters.
Table 7.52. Summary of Significant Paths between Socio-Economic and Psychological Variables

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*Note: SES = socio-economic status; PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning.*
**Effort Structural Equation Model**

**Overview of Research questions 4.5-4.6: Goodness-of-fit and paths between psycho-social variables and achievement in McInerney’s Revised Model of Student Effort.** Research questions 4.5 and 4.6 asked whether McInerney’s revised model of student effort would demonstrate an adequate fit with the PNG data, and what the key relations are between the psycho-social variables and student effort.

**Results and conclusions for Research questions 4.5-4.6: Goodness-of-fit and paths between psycho-social variables and achievement in McInerney’s Revised Model of Student Effort.** A second all-encompassing SEM was conducted examining the relations between the socio-economic variables, the psychological variables, and student effort outcomes. This model demonstrated an excellent fit with the data as indicated by an RMSEA of .046, a CFI and TLI of .94, and Chi-square statistic and degrees of freedom of 13444.42 and 5068 respectively. The path estimates for the relations between these variables are displayed in the following tables. Total, direct, and indirect effects are reported for each set of variable paths. Tables 7.53, 7.54, 7.55, 7.56, 7.57, 7.58, and 7.59 correspond to the path coefficients for students’ socio-economic status, parent education, future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation respectively.
Table 7.53. *Summary of Total, Direct, and Indirect Effects for Socio-Economic Status Paths*

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*p<.05, **p<.01, +p=borderline significant

Note: SES = socio-economic status; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
Table 7.54. *Summary of Total, Direct, and Indirect Effects for Parent Education*

**Paths**

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*p<.05, **p<.01

Note: PE = parent education; SFG = success future goals; AFG = authority future goals; VFG = village future goals; SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
Table 7.55. *Summary of Total, Direct, and Indirect Effects for Future Goal Orientation Paths*

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*p<.05, **p<.01

Note: SFG = success future goals; AFG = authority future goals; VFG = village future goals; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
Table 7.56. Summary of Total, Direct, and Indirect Effects for Perceived Instrumental Value Paths

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*p<.05, **p<.01

Note: SIV = success instrumental value; AIV = authority instrumental value; VIV = village instrumental value; MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
Table 7.57. Summary of Total, Direct, and Indirect Effects for Motivation Paths

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Table 7.58. Summary of Total, Direct, and Indirect Effects for Self-Concept

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*p<.05, **p<.01

Note: MAS = mastery; PER = performance; SOC = social; ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
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*p<.05, **p<.01

Note: ESC = English self-concept; MSC = mathematics self-concept; GSC = general self-concept; ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.

Table 7.59. Summary of Total, Direct, and Indirect Effects for Self-Regulation

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<td>.16</td>
<td>.16</td>
<td>-</td>
</tr>
<tr>
<td>REH – MAT</td>
<td>.09</td>
<td>.09</td>
<td>-</td>
</tr>
<tr>
<td>CLA – ENG</td>
<td>-.08</td>
<td>-.08</td>
<td>-</td>
</tr>
<tr>
<td>CLA – MAT</td>
<td>.02</td>
<td>.02</td>
<td>-</td>
</tr>
<tr>
<td>PLA – ENG</td>
<td>.01</td>
<td>.01</td>
<td>-</td>
</tr>
<tr>
<td>PLA – MAT</td>
<td>-.18</td>
<td>-.18</td>
<td>-</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01

Note: ELA = elaboration; REH = rehearsal; CLA = clarification; PLA = planning; ENG = English effort; MAT = mathematics effort.
The significant predictors of student effort outcomes in the SEM were as follows: (a) there were six positive predictors of English effort scores including socio-economic status, parent education, village future goals, success instrumental value, mastery immediate goals, and English self-concept; (b) there were three positive predictors of math effort scores, which were parent education, authority future goals, and mastery goal orientations; (c) there were two negative predictors of maths effort scores, which were authority instrumental value and performance immediate goals; and (d) there were no negative predictors of English effort scores. Although there were no total effect negative predictors of English effort scores, success future goals had a significant and negative direct effect on English effort but a significant and positive indirect effect on English effort. Whilst the success future goals themselves were influencing effort scores in contradictory ways, the success instrumental value variable was positively predicting English effort scores. This was a similar finding for the authority-related goals. Whilst authority future goals were positively influencing math effort, authority instrumental value was negatively predicting math effort scores. These findings are most likely due to the interaction effects highlighted earlier in the chapter between future goals and instrumental value. It is likely that there is an interaction between students’ success and authority future goals and the perceived instrumental value of schooling that is ultimately influencing their English and math effort outcomes. Although beyond the scope of this investigation, future research could attempt to include this latent interaction within a comprehensive understanding of student
achievement and effort, in order to gain a complete understanding of the
significant influences of student academic outcomes.

In addition to the significant influences of English and math effort
outcomes, there were also a number of significant paths between the socio-
economic and psychological variables themselves. As expected, the paths within
the effort SEM were consistent with the paths for the achievement model. The
only difference was that for the effort model, the total and direct effect paths
between mastery goals and general self-concept reached significance ($t=1.96$),
but were not significant for the achievement model ($t=1.85$). These differences
are small and are not a crucial focus of the investigation. As with the
achievement SEM, significant paths of interest in the effort SEM, will be
discussed in Chapter 9.

**Section Summary**

Analyses presented in this section examined the model fit and path
coefficients of two comprehensive SEMs. Both models examined the paths
between the students’ socio-economic variables, their future goal orientation and
perceived instrumental value, their motivation, their self-concept, their self-
regulation, and the influence these variables had on their achievement and effort
applied in the school setting. Both models demonstrated a good fit with the data,
and for all paths, the total, direct, and indirect effects were presented. Significant
paths were highlighted accordingly.
Summary

The current chapter presented the quantitative findings that examined the research questions for Study 2 that were put forth in Chapter 4. It presented results for analyses that examined: (a) the individual relations between students’ socio-economic variables, future-goal orientation, perceived instrumental value, motivation, self-concept, self-regulation, and achievement and effort; (b) whether or not there were differences across gender, grade, and region groups in the path coefficients of these individual models; and (c) the model fit and total, direct, and indirect paths of two all-encompassing SEMs examining the overall relations between the variables under investigation. Key and significant paths were highlighted throughout the chapter. These results will be discussed in greater detail in Chapter 9 where implications for theory, research, and practice will be discussed. The following chapter, however, examines each of the five psychological variables that were examined in the current chapter, using analyses performed on qualitative data collected from students, teachers, and parents in PNG.
CHAPTER EIGHT
A QUALITATIVE INVESTIGATION OF STUDENT EDUCATIONAL INFLUENCES IN PAPUA NEW GUINEA

Introduction

The aim of the current chapter is to present student, teacher, and parent data further highlighting the underlying processes involved in student learning and achievement in Papua New Guinea (PNG). The previous two chapters presented the results of Study 1 and Study 2 based upon the quantitative, questionnaire data analyses. These analyses targeted five specific psychological variables as being significant predictors of student achievement and effort – future goal orientation, perceived instrumental value, motivation, self-regulation, and self-concept. The current chapter presents the findings and data analyses for the third component of the research.

The first aim of the chapter is to target the same key areas that were examined in the quantitative analyses. In doing this an exploration of the students’, teachers’, and parents’ own explanations of the five psychological variables is presented, to substantiate the data from the statistical outcomes. Five research questions (Research questions 1.1 – 1.5) were posed in Chapter 4, asking what the substantive and most frequently occurring issues and themes were that emerged from the data regarding students’ future goals, perceived instrumental value, motivation, self-concept, and self-regulation. These research questions are addressed in the first sections of the current chapter.
The second aim of the chapter is to present additional findings that have emerged through the participants’ responses that were not directly targeted in the quantitative studies. Research question 2.1 (see Chapter 4) asked what additional themes to those investigated in the quantitative studies, emerged from the data. This research question will therefore be investigated across all data analyses presented in the chapter.

Finally, Research question 2.2 (see Chapter 4) asked how the themes identified in the qualitative analyses relate to the findings from the quantitative studies. Therefore, throughout the chapter triangulated findings are presented across the three studies and across student, teacher, and parent data.

**Qualitative Results: Themes Consistent with Quantitative Targeted Factors**

The previous chapter clearly identified five psychological variables as being important predictors of PNG students’ academic outcomes. These variables were future goal orientation, perceived instrumental value, motivation, self-regulation, and self-concept and they were specifically targeted in the quantitative analyses as being significant influences of student effort and achievement in school. To recapitulate, future goal orientation refers to the actual types of goals and amount of value students place on distant goals that they set for their futures. Perceived instrumentality is the value that students place on their current schooling experiences in helping them to reach their future goals. In the previous two chapters, success, authority and village future goals and their instrumentality were examined in relation to the other psychological variables and student achievement and effort levels. Motivation was also examined in
relation to these variables and refers to the immediate achievement goals that students adopt that influence their effort and reasons for engagement and attaining competence in school. Mastery, performance, and social goals were examined in addition to the eight first-order achievement goals – task, effort, competition, social power, praise, token, affiliation, and social concern. Self-regulation learning strategies were also examined looking at how students employed these to assist them in their learning and understanding of school material. Finally, self-concept was examined in relation to psychological and outcome variables and this refers to students’ beliefs about their current ability and performance in school. In the combined model of student achievement, many of these variables were found to have made significant unique contributions in explaining both student achievement outcomes and changes in other psychological variables. Specifically, positive predictors of student outcomes included village future goals and instrumentality, mastery, task, and social concern achievement goals, clarification learning strategies, and self-concept. Negative predictors included authority future goals and instrumentality, and performance, social power, praise, and affiliation motivational goals.

The following section presents data and analyses in the form of student, teacher, and parent interviews, exploring their stated views about the five psychological variables in McInerney’s model of student achievement (originally discussed in Chapter 3). Although the data were interrogated for all five variables, only the first four variables were found substantially within the qualitative interviews and open ended responses. For example, only two comments were made about student self-concept, one by a student who stated
that he was not very good at mathematics, and one by a parent who suggested that mathematics was ‘a big headache for students in Papua New Guinea’ due to the subject requiring lots of ‘calculations’. Otherwise, the majority of data that were collected targeted the future goals, instrumental value, motivation, and self-regulation categories. The following sections explore these specific four themes in further detail.

**Future Goal Orientation**

In Chapter 7 the relations between future goal orientation and student outcomes were examined. It was found that whilst success goals did not significantly predict student outcomes, village goals were positively related and authority goals were negatively related to achievement. Although success goals did not appear to directly influence achievement, they were positively related to motivation, self-regulation and self-concept. In the data analyses that follow, the frequencies of responses surrounding specific success, authority, and village future goals are firstly presented and then highlighted by student, teacher, and parent comments.

**Future Goal Frequencies**

In the previous chapters, three categories of future goals were examined. These were success goals, authority goals, and village goals. Upon analysis of the data in the current chapter, eight major future goal orientation themes emerged as being important to the students. Five of these themes, earning money, opening up employment opportunities, embarking upon future studies, gaining
knowledge, and obtaining the goal of ‘becoming somebody’, fell into the success category targeted in the previous chapter. A further two goals, supporting their family and helping the community, corresponded with the village category. The eighth theme that emerged was that of specific personal goals, and these were not measured quantitatively. No authority related goals emerged from either the interviews or the open ended question responses.

The percentages of student, teacher, and parent interview responses across these eight themes are displayed in Table 8.1. Since it was possible (and often likely) that individuals would respond across more than one future goal category, these figures have been calculated as a percentage of the number of individuals who responded in each group. Also displayed in this table are the student responses to the open ended questions across each of the eight themes. Again, since students were able to give as many responses as they desired (that is, more than one response to any one question), these figures were calculated as a percentage of the total number of student respondents for that question and the figures could sum to be more than 100%. Seven hundred and fifty four students answered the question ‘what would you like to do after you complete school?’.

Across both the interview data and students’ open ended responses, the top four most frequently mentioned future goals were: embarking upon further studies, reaching a specific, personal goal, getting a job, and looking after the family. All eight themes will be explored in detail in the following sections. The first four goals, employment, specific goal, job and family are discussed in order of the most popular responses as shown in Table 8.1.
Table 8.1. *Future Goal Orientation Themes Emerging from Student, Teacher, and Parent Data*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Question Responses (n=754)</th>
<th>Student Interview Responses (n=32)</th>
<th>Teacher Interview Responses (n=11)</th>
<th>Parent Interview Responses (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further Studies</td>
<td>480 (63.66%)</td>
<td>14 (43.75%)</td>
<td>-</td>
<td>8 (88.89%)</td>
</tr>
<tr>
<td>Personal Goals</td>
<td>276 (36.60%)</td>
<td>28 (87.5%)</td>
<td>4 (36.36%)</td>
<td>3 (33.33%)</td>
</tr>
<tr>
<td>Job</td>
<td>213 (28.25%)</td>
<td>6 (18.75%)</td>
<td>-</td>
<td>2 (22.22%)</td>
</tr>
<tr>
<td>Family</td>
<td>92 (12.20%)</td>
<td>5 (15.63%)</td>
<td>-</td>
<td>2 (22.22%)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>36 (4.77%)</td>
<td>5 (15.63%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Village/Community</td>
<td>44 (5.84%)</td>
<td>3 (9.38%)</td>
<td>1 (9.10%)</td>
<td>1 (11.11%)</td>
</tr>
<tr>
<td>Be Somebody</td>
<td>62 (8.22%)</td>
<td>2 (6.25%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Money</td>
<td>42 (5.57%)</td>
<td>1 (3.13%)</td>
<td>-</td>
<td>2 (22.22%)</td>
</tr>
</tbody>
</table>

*Note. Percentages as a percentage of the number of interviews within each group are displayed in brackets.*

**Future Goal Themes**

*I Want To Go To University*’

Across both the interview and question data, students commented generally on the desire to complete further studies, as well as to specifically graduate from high school, attend university or some other tertiary institution, and continue relevant and appropriate training for other future goals.
In a second open ended question that was asked (‘what sort of training would help you to achieve what you want to do after you complete high school?’), 58% of students answered university, whilst 21% suggested that a training course would be useful, and 5% mentioned an apprenticeship and general study. Students often spoke of university as being a pathway to help them achieve other goals, such as gaining employment or reaching their specific personal goals. An example of using university as a pathway to achieving a specific goal was given by the following student:

if I leave school… I would like to do my best to make it to university to go to study law... yeah that’s what I wanna be when I leave school... I wanna become a lawyer [SI38]

Many students suggested that simply completing high school was no longer sufficient for their future. They spoke about how the modern workforce requires students to have additional qualifications and training. This understanding was particularly evident in the data from urban students who would generally have more access to a ‘modern workforce’ and more Western living styles. The following urban student emphasised this:

Because nowadays, when you complete high school you won’t get anywhere. But when you get to university, you’ll get somewhere [SQ153]

However, when reflecting on the likelihood of them attending university or other forms of further education, students said that whilst university would be the ‘best case’ scenario, it is often difficult to attain due to financial difficulties. For example, one student stated that it would be ‘best that they finish 12 and [go]
straight to uni’ because most students ‘are still searching for jobs’ so it would be ‘best if they make it to uni and then apply for better jobs’. However, other students also acknowledged the burdens placed on their families in providing financial assistance for these goals as well as the burden placed on the students themselves in attaining the qualifications necessary to obtain a place in a university degree.

Alternatively, some students discussed the parental pressure they experienced in pursuing further education. These students often mentioned that this parental pressure was direct and that parents offered specific encouragement in their pursuit of higher education. This was evidenced by the following primary aged urban student who said:

*It is important for me to complete school so my Dad can be proud of me… he keeps on nagging that I can’t get past uni like he did… I want to prove him wrong.* [SQ336]

In addition to and supporting student responses, mention of further studies and attending university was the most frequent response given by parents in the semi-structured interviews. However, parents tended to talk about future education in smaller steps or goals than the students did. For example, this parent said of their primary aged child:

*If they’re capable in their education then they can go to Grade 8 and continue to Grade 10 and if they are still capable they will still continue to 12 and… continue* [PI31]
Given the challenges in PNG, attaining certain educational levels are usually seen as important milestones. As outlined in Chapter 2, the number of students who actually progress beyond a primary school level of education becomes increasingly smaller as the education grades increase. It is therefore often viewed by parents and communities as a significant achievement to reach upper primary school, an even greater achievement to enter high school, and a more noteworthy achievement to graduate from high school and enrol in higher education. It was therefore understandable for parents to focus on these progressive milestones as they spoke about further education related future goals.

In summary, attending university or engaging in other further study activities was seen as important and relevant goals for students as indicated by both interview and open ended question data from both students and their parents. The next section outlines the specific personal goals that students reported as being important to their futures.

‘I Have My Own Personal Goals’

Consistent across student interviews and open ended responses were students’ mention of specific, personal goals that they had set for their futures. These goals ranged from specific occupations they wanted to achieve, to leadership roles, to specific educational paths. A large number of students aspired to professional vocations, such as accounting, teaching, medicine, and law. A smaller number of students expressed a desire to go into careers involved in politics, whilst some students mentioned embarking upon business and engineering career paths.
Many students, when prompted, expanded on the reasons they valued particular personal goals and some of the characteristics and qualities they would need to adopt in order to achieve such goals. An illustration of this was given by an urban student who had been identified as a high achiever:

*Ok… this is my biggest ambition in life, to be the first female Prime Minister of Papua New Guinea… I’d have to have leadership; [I] would need to be responsible. In this level, I’d have to be a leader so that in the future I can be a better leader of this nation some day. [SI15]*

Students from urban and rural regions tended to state roles associated with organisations or businesses that would be located in urban regions throughout the country more frequently than village students did. Students from the village regions reported specific village related roles as being important to them more frequently than their urban and rural peers. These goals were identified as being more useful and applicable to a village subsistence-based lifestyle and specifically to assisting those within their villages. These students spoke of occupations such as teaching, farming, nursing, and community development that would provide more relevance to their village-based lifestyles. These aspirations were expressed by the following village student:

*I would like to be a pilot… I always dream of flying and also, I can help transport sick people from my village to big hospitals in PNG [SQ334]*

Likewise, this village student said:
I want to become a doctor because my village people are dying without getting medicine. There’s no doctors so I wanted to help them by providing medicine. [SQ811]

These two students emphasised the important influence that students’ surroundings and experiences appear to have on the goals that they set for their futures. Another student from a rural area said that he wanted to go to university in order to become a doctor due to the lack of any medical personnel in his village clan. He went on to say:

Today the poor people are getting poorer and the rich are getting richer and if I intend to become a doctor that will make my life easier to stay with my people [SQ54]

This desire of students, from all three regional areas in PNG, to help their villages and families will be discussed in further detail later.

Therefore, as can be seen from the data presented in this section, students had a wide variety of very specific goals that they had set for their futures and these goals were often influenced by their environmental, family, and social surroundings. The following section explores the goals students espoused that were concerned with gaining future employment.

‘I Want To Get A Job’

The third most frequently highlighted theme across both interview and open ended response data was the goal to get a job in the future. A large number of students in their interviews mentioned the desire to gain future employment, whilst many mentioned the need to attend university or some form of training in
order to be qualified to get a job. Approximately 28% of students mentioned getting a job in their response to what they wanted to do after they completed school. Furthermore, when specifically asked ‘how important is it to you to get a job’, 67.4% of students replied ‘very important’, whilst 31.2% said that is was ‘important’. Only 1.2% said that it was not important to get a job.

One of the patterns that emerged within this theme was that students emphasised that getting a job would be helpful for, or would be a ‘path’ for, achieving other goals such as reaching a specific, personal goal, or helping one’s family. For instance, a goal pathway was highlighted by this village student who said:

*I want to become a… want to go get [a] good job so that I can help my parents in the village… and all those things [SI27]*

In a similar way, this village student said:

*In future… I’ll finish my school, and get a better job, and help my family members [SI6]*

Gaining employment was also noted as a pathway to having a better future, gaining financial security, and being able to be self-sufficient, rather than relying on family or community support.

In order to explore further the reasons why students held employment goals, a further open ended question was presented and 682 students responded to it. The question asked ‘why is it important to you to get a job?’. Eleven main themes emerged from the students’ responses to this question and the proportion of student responses to each of those categories are displayed in Table 8.2.
As can be seen from Table 8.2, the most frequent response to why students stated that getting a job is important was to help support their families. Approximately half of all students said that getting a job would help them to support or look after both their immediate and extended families. This theme was powerfully encapsulated by a student who responded to the question ‘is it important for you to get a job’ with:

*Very much, with tears of joy, because I want to take care of my only two beloved parents [SQ766]*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Family</td>
<td>340</td>
<td>49.9%</td>
</tr>
<tr>
<td>Money</td>
<td>152</td>
<td>22.3%</td>
</tr>
<tr>
<td>Supporting Own Needs</td>
<td>131</td>
<td>19.2%</td>
</tr>
<tr>
<td>Survival</td>
<td>81</td>
<td>11.9%</td>
</tr>
<tr>
<td>Repaying Family</td>
<td>67</td>
<td>9.8%</td>
</tr>
<tr>
<td>Community</td>
<td>48</td>
<td>7.0%</td>
</tr>
<tr>
<td>Better Future</td>
<td>38</td>
<td>5.6%</td>
</tr>
<tr>
<td>Tried Hard</td>
<td>33</td>
<td>4.8%</td>
</tr>
<tr>
<td>Being Somebody</td>
<td>26</td>
<td>3.8%</td>
</tr>
<tr>
<td>Personal Satisfaction</td>
<td>16</td>
<td>2.3%</td>
</tr>
<tr>
<td>Specific Goal</td>
<td>16</td>
<td>2.3%</td>
</tr>
</tbody>
</table>
This family orientation was also expanded beyond that of simply ‘supporting’ one’s family, to actually ‘repaying’ them for the financial support students had been provided with. Almost ten percent of students expressed a desire to actually repay their family for the money that their parents invested in them during their schooling years. One example of this was when one student mentioned that he needed to repay his family for the money that they had ‘lost’ in paying his school fees over the years. Another said that getting a job was:

…very important because I owe my parents so much and would like to pay them back and also the fact that I might be interested in starting up a family of my own. [SQ458]

Picking up this theme, a number of students said that they needed to gain employment so that they could help pay the school fees for other members in their family who would like to go to school. The language that students used to discuss their responsibility to repay their families was also a point of interest. Students often commented that their parents might ‘waste’ their money on them and that they did not want to ‘disappoint’ their family financially. It seems that students were using this language to emphasise the responsibility that many mentioned they are entrusted with to return financial support to their families. An example of this is evident in this student’s response:

It is very important for me to get a job and pay back what my parents had wasted on me [SQ35]

Likewise, another said that they needed to help their ‘poor parents who have wasted a lot on me’. It is reasonable to suggest that students appear to be greatly influenced by, and aware of, the struggles in PNG of families to provide their
children with long term access to education and other financial difficulties. In a country where only 1.5% of all children actually graduate from high school (see Chapter 2) it is understandable that students would use words such as ‘not wasting’ and ‘my responsibility’ when referring to the money that would be invested in their schooling. This theme of providing family support and financial assistance also emerged as a separate and unique future goal and will be discussed in more detail later in the chapter.

Other reasons stated for getting a job were to earn money, to survive or keep off the streets, and to look after their own personal needs for the future. The category of survival was a theme explored often by students, teachers, and parents across a range of interview questions. Often students acknowledged the link between survival difficulty, getting a job and supporting their family. This student’s response was representative of the majority of students who mentioned these themes of survival:

*It is very important for me to get a job, because today city life is very hard, where you have to live with money every day, so by getting a job I will be able to look after myself and also my family members in the city.* [SQ646]

This theme of survival will be explored in more detail later on in the chapter when students consider the role that school can serve in helping them to survive and avoid poverty in the future. As with attending university, gaining employment was also seen as a pathway for either attaining other future goals pertaining to supporting one’s family, or avoiding negative future consequences such as life on the streets.
Finally, there were four other reasons for getting a job that were noted less frequently by students. First, students spoke of the desire to gain employment because they had tried hard in school and did not want their effort to go to waste. Second, students wanted to help their broader social communities and they reported a link between getting a job and being able to assist in this manner. Third, students wanted to gain personal satisfaction for achieving the particular milestone of gaining employment. Finally, students suggested that getting a job would assist them in becoming a successful person in the future.

To summarise this section, gaining employment emerged as an important goal that students had set for their futures. Furthermore, as shown by the data, students aspired to these job-oriented goals because of a large number of reasons. Most importantly, students highlighted supporting and repaying one’s family, earning money, and looking after oneself in the future as the main reasons for gaining employment. The next section explores in greater detail students’ specific family future goal orientations.

‘I Want to Look After My Family’

The next most frequently reported future goal of students, was that of looking after their family, both immediate and extended. Again, students often spoke of a responsibility they felt they had to look after their families and the importance of achieving other goals (such as getting a job and earning money) to help them in achieving this goal. Many students stated the responsibility of ‘all’ students in supporting their families. For example:
All of us go to school... is good because in future all of us are going to look after our families and relatives and clan members [SI5]

Other students noted the broader social expectation in PNG that is placed upon students to help their families:

*I must give financial help to my parents and siblings for it is our culture and I must do it* [SQ816]

Again, within students’ family oriented responses, the theme of poverty and survival emerged. Many students expressed a desire to help their families in surviving hardships by providing them with financial assistance as well as other indirect methods of support. Students also suggested that taking what they had learnt at school back to their families could help to improve their existence. This was demonstrated by one student who emphasised the importance of supporting his parents and his own future family during 'times of hunger and thirst'.

In addition to student responses surrounding family, some parents also stressed their desire to see their children wanting to support them. This parent living in a remote village in PNG spoke of her expectations for her daughter:

*She would work and help me. She would work in [Port] Moresby to earn money... She would give the money to me and I would buy what I need for the village and for my family.* [PI4]

Again, this theme of ‘responsibility’ emerged strongly in parent responses. The connection, however, between parent expectations and student resultant feelings of responsibility, was not available in the data. Whilst only some parents spoke of these expectations they held of their children, quite a large number of students
expressed their feelings of responsibility to help support their families. Students’ feelings of responsibility are therefore arguably a result of a combination of culture, family, and broader environmental, social, and economic influences.

It is worthwhile examining the results of village future goals within the context of findings from the previous two chapters. The themes of supporting and looking after one’s family are consistent with the village future goal orientations that were measured by the student questionnaire in Chapter 6. Village future goal orientations were found to be positively related with both student achievement and effort outcomes. They were also positively related to social motivational orientations concerned with helping, showing concern for, and affiliating with their peers. The data presented in the current chapter strongly supports this link between village aspirations and the adoption of social goals. Themes of social concern and providing help for students’ families consistently emerged from the student data when they were talking about their family related future goals.

Furthermore, the finding that students frequently endorse family related goals is an encouraging finding given the positive relation identified in the previous chapter between these goals and student outcomes. It is reasonable to conclude that these naturally emerging village goals should be encouraged and nurtured among PNG students as a way of promoting achievement and effort outcomes. Also of interest, is that even though village goals were positively related to social motivation goals and student outcomes, the social goals themselves were not directly related to student outcomes. Therefore, it seems that it is the act of actually holding a village aspiration as a future goal, rather
than the immediate school related social goals, that are important for adopting and for influencing outcomes. Educators might consider that these village goals, including family goals, should therefore be encouraged in students. Further analyses examining students’ immediate social goals will be discussed later in the chapter.

In summary, holding a family orientation as a future goal emerged as a common aspiration amongst these PNG students and seems to be an important goal to foster in the education setting. The next section discusses the goal that many students held about the desire to ‘be somebody’ successful in the future.

‘I Want To Become Somebody’

The next goal that students mentioned was important for them was to ‘become somebody’ or achieve a milestone defined as ‘successful’ in their lives. Students consistently made mention of these goals with statements such as ‘like in the future, I wanted to become somebody’. This is seen by the following urban student’s desire to:

*learn new things, especially English, so that I can teach junior school, to become somebody [SI45]*

Along the same lines, another student stated that they ‘wanted to be a perfect person in the future’ and that completing school was important for them to ‘be somebody in future’.

Other students highlighted the feelings of pride and satisfaction that were often associated with achieving successful milestones. For instance, students
referred to their desires to achieve large numbers of goals (e.g., graduating and getting job) in order to ultimately ‘be the proudest person in the world’.

The ways in which students spoke about this and other success related goals was of interest. Whilst many students were not shy to mention ‘becoming somebody’ as an actual goal, they were reluctant when prompted to make mention of any status related goals associated with becoming somebody. Status related goals were measured in the previous chapters as ‘authority’ goals and they were found to be negatively related to both achievement and effort outcomes. They were also positively related with immediate performance oriented achievement goals, which in turn were negatively related to student outcomes. However, the data analysed in the current chapter, found that students distinguished between success goals and authority goals, and that authority related goals, such as gaining a certain status level in an occupation, were arguably not relevant for the students. Therefore students seem to be naturally drawing distinctions between the more adaptive success goals and the maladaptive authority goals and are not appearing to endorse the latter category of goals. Interview and open ended question data describing the relations between student success related goals, such as becoming somebody, and student outcomes will be discussed in more detail later in the chapter.

The following section describes the next most frequently mentioned future goal, students’ broader community oriented goals.
‘I Want To Help My Community’

A number of students mentioned goals that were related to helping out their villages and communities. Similar to students’ family related goals, students specifically spoke of their broader social communities and the responsibilities they felt they had towards helping them out. Again, other goals, such as gaining employment and earning money, were seen as paths and opportunities that could often lead students to a position where they would be able to help their communities. A common example of this was given by the following student:

*in my future, I’m going to work for pay and help them in a little bit of money, and help the community [SI5]*

Similarly, other students spoke about their desire to help their village increase their knowledge in sustainable community development practices and other areas of expertise that would benefit a developing country community.

Some students focused on the living difficulties within their communities and their desire to help. These views were expressed by the following rural student:

*I would like to help my community so that they can have a focus in life, thus having a better living standard because I see that the Government is not bothered about the ordinary citizens. And the people just need someone who can help them. [SQ463]*

Again, it seems reasonable to conclude that students seem aware of the reality of their environmental and social circumstances and are channelling that into their goal formations. As with students’ goals about their families, students often used
terms such as ‘responsibility’ and ‘I must’ when mentioning their desire to assist their communities.

A small number of students expanded this community orientation to be a broader society, nation or world-based orientation. For instance, the following socially aware student strongly explained her community orientation:

_I would like to become a useful citizen of my province, country, and community so I can be of help and not a parasite._ [SQ91]

This mention of the term ‘parasite’ may be in reference to the many socially disapproved and rebellious groups commonly found in Papua New Guinean communities and cities. Many rebel groups such as ‘Raskol’ gangs are involved in much crime and socially unacceptable behaviour, and are viewed as ‘nuisances’ to other PNG citizens. Many students stated their desire to contribute something that would be useful to their societies rather than becoming a burden. Although there is no welfare system in PNG and therefore ‘parasite’ groups are not a direct burden on the Government, many of the undesirable side-effects of their unemployment and social security status become quite burdensome to the people of PNG.

This issue requires broader discussion and will therefore be returned to in a later section of this chapter. However the main point to be made from these community-oriented students is that they express a desire to contribute to society rather than ending up lacking in skills, knowledge, and opportunities to make such a contribution. The next
section discusses students’ monetary and financially related future goal orientations.

‘I Want To Earn Money’

A small number of students held future goals involving the earning of money. However, this goal was most often discussed as a positive by-product of gaining employment, or as a means to helping one’s family or community. Some students reported their awareness of the current economic failings in PNG as expressed by this student’s goal:

To earn a better and bright living, because nowadays we are living in an economical crisis, e.g., store goods price[s] have gone up and therefore we need to have job[s] to support our family [SQ465]

This same student then went on to emphasise the need to gain employment in order to have her own financial savings to support herself and to live a healthy lifestyle in the future. This was typical of many of the students who were money future goal oriented.

In addition to earning money as a pathway to achieving personal, more individualistic goals, students discussed the need to earn money so that they would be in a financial position to repay their parents for the money they invested into their schooling. As mentioned earlier, the theme of earning money was often explored when students spoke of supporting their families and repaying them for their school fees and other monetary assistance they had been provided with throughout their schooling.
Money was also occasionally referred to as representing a successful achievement in one’s life, which is consistent with the ‘success’ future goal category explored in the previous chapters. The final student future goal orientation of gaining knowledge is discussed in the following section.

‘I Want To Gain More Knowledge’

The final category of future goal orientation that emerged from the interview and open ended response data was that of gaining knowledge and certain educational skills. Students spoke of their desire to continue specifically with their ‘level of understanding’ of certain school related issues and to be ‘well educated’ in the future. This was illustrated by this student who reported that one of his future goals was to:

*Learn from here [school] so that when I go out, all of the knowledge that I get from here, then I can go and apply for that*

[SI34]

Furthermore, some students discussed specific skills and knowledge areas as being the goals that they had set for their immediate futures. Skill areas such as learning to read and write, were reported as being important desires for the future along with specific language skills, such as learning to speak English, and learning specific subject content, such as community development and sustainable tourism.

These knowledge related future goals were not directly assessed in the previous two chapters and should be included as important student aspirations
for future research examining the direct links between student future goals and academic outcomes.

**Summary**

This section has presented the frequencies and participant responses, for the eight types of future goals that emerged from the data. The comments from the students, and some of the teachers and parents, were presented to provide a deeper insight into the three categories of future goals (success, village, and authority goals) that were examined in the data analyses presented in the previous two chapters. It is interesting to note that the majority of themes emerging from the student responses were focused around the success and village orientations, which were positively related to outcome variables and other positive psychological variables in Chapter 7. Students’ mention of status related authority orientations did not emerge as an important goal in the current chapter’s data analyses.

The next section discusses students’ perceived instrumental value of schooling in helping them achieve their future goals. In this section, the eight future goals are discussed in relation to how important students believe school is in helping them reach these goals. Furthermore, an additional goal orientation of keeping off the streets is discussed in which students were specifically talking about how schooling provides opportunities for them to reach this outcome.
Perceived Instrumental Value

As outlined in previous chapters, the perceived instrumental value of schooling is the amount that a student values certain aspects of their schooling as being able to help them reach the goals they have set for their future. In the quantitative chapters, the three future goal categories corresponded with the three perceived instrumental value categories. That is, for success, authority, and village future goals, students were asked how important they thought school was in helping them achieve these goals. In the qualitative analyses, the eight future goal orientations that emerged in the previous section were examined for instrumental value. That is, for the goals of further education, reaching a specific goal, getting a job, supporting one’s family, becoming somebody, helping the community, earning money, and gaining knowledge students were asked how important they thought school was to them in helping them actually achieve these goals. Therefore, there is an interplay between the current and previous perceived instrumental value and future goal orientation sections. The following sections outline students’ perceived instrumental value of schooling for attaining these eight goals. In addition to these eight goals, an additional goal emerged from the data when students were specifically asked about the value they placed on schooling in helping them in the future. This was the goal to survive and keep off the streets. Finally, interesting findings emerged when students were asked what they thought they would end up doing in the future if they did not have the opportunity to attend school. What follows is a presentation of data for all ten sections of the perceived instrumentality of students’ schooling.
**Perceived Instrumental Value Frequencies**

Table 8.3 displays the frequencies of student, teacher, and parent interview responses across the different categories of perceived instrumental value. As with future goal orientation, respondents were able to provide answers across more than one category and therefore percentages have been calculated as a percentage of the number of individuals who responded. In addition to student, teacher, and parent interviews, open ended questions were asked of students regarding the perceived instrumental value of schooling. First, students were asked how important it was for them to complete school. A total of 70.5% of students said it was ‘very important’, 28.7% said it was ‘important’, and only 0.8% said it was ‘not important’. Next, students were asked why it was important for them to complete school and seven hundred and fourteen students provided responses. Also displayed in Table 8.3 are the frequencies of students’ responses to this question across the same nine themes that emerged from the interview data. Again, individual students were able to answer across more than one category. In total, nine themes emerged from the data and each of these themes will be discussed in more detail in the following sections. Themes will be discussed in the order in which they are presented in the table.
Table 8.3. *Perceived Instrumental Value Themes Emerging from Student, Teacher, and Parent Data*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Question Responses (n=714)</th>
<th>Student Interview Responses (n=32)</th>
<th>Teacher Interview Responses (n=11)</th>
<th>Parent Interview Responses (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
<td>208 (29.13%)</td>
<td>11 (34.38%)</td>
<td>-</td>
<td>4 (44.44%)</td>
</tr>
<tr>
<td>Keep off streets</td>
<td>48 (6.72%)</td>
<td>8 (25.00%)</td>
<td>2 (18.18%)</td>
<td>6 (66.67%)</td>
</tr>
<tr>
<td>Family</td>
<td>147 (20.59%)</td>
<td>6 (18.75%)</td>
<td>2 (18.18%)</td>
<td>3 (33.33%)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>133 (18.36%)</td>
<td>8 (25.00%)</td>
<td>1 (9.10%)</td>
<td>1 (11.11%)</td>
</tr>
<tr>
<td>Speaking/Writing</td>
<td>-</td>
<td>4 (12.50%)</td>
<td>-</td>
<td>5 (55.56%)</td>
</tr>
<tr>
<td>Domain Specific</td>
<td>-</td>
<td>12 (37.50%)</td>
<td>1 (9.10%)</td>
<td>-</td>
</tr>
<tr>
<td>Be Somebody</td>
<td>90 (12.61%)</td>
<td>8 (25.00%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Further Studies</td>
<td>54 (7.56%)</td>
<td>7 (21.88%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Money</td>
<td>57 (7.98%)</td>
<td>5 (15.63%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Village/Community</td>
<td>27 (3.78%)</td>
<td>5 (15.63%)</td>
<td>-</td>
<td>2 (22.22%)</td>
</tr>
<tr>
<td>Personal Goals</td>
<td>80 (11.20%)</td>
<td>3 (9.38%)</td>
<td>1 (9.10%)</td>
<td>4 (44.44%)</td>
</tr>
</tbody>
</table>
Perceived Instrumental Value Themes

Before specific themes are examined it is important to note that students’ schooling and educational activities were often referred to in general as being useful for students’ overall future goals and overall life achievements. Many students conveyed their opinion that school is of utmost importance in life and for all aspects of their future. One student said that school was as important as ‘going to heaven’, whilst another student stated that school was ‘so important because it ‘mean[s] life of breath’. The following student summarised the general student thought on the importance of school:

It [school] has to be the most important thing in my life ‘cause without it I wouldn’t even have a life [SQ322]

As well as these students who discussed the importance of school for their life in general terms, most students also went on to discuss the specific ways in which school was useful, why they valued it, and how they thought it would contribute to their successful attainment of future goals. The ways in which school was believed to be instrumental in reaching each of these specific future goals will be discussed in the following sections.

‘School Will Help Me Get A Job’

The most frequently mentioned theme across both the interview and open ended response data was the perceived usefulness of school in helping students to gain employment. Many students reported a perceived definitive link between graduating from high school and getting a job. One village student who had been brought up within a difficult village subsistence-based lifestyle said:
If you wanna get... do better in your work, or get a job, you have
to go to school and learn something [SI12]

Many of the students used terms such as ‘have’ and ‘need’ when they were talking about the importance of being educated in order to get a job. Similarly, other students said that being educated and having knowledge would make it easier to get a job.

In order to explore the reasons why students thought school was useful to them in gaining employment, two additional open ended questions were asked. Firstly, students were asked the question ‘do you think completing school will help you to get a job?’. A total of 91.7% of students replied ‘yes’ and 8.3% replied ‘no’. Students were then asked why they thought school would help them to get a job. Ten main themes emerged as being the reasons that school is helpful in gaining employment in the future. These themes are displayed in Table 8.4.

As can be seen in Table 8.4, almost one-quarter of students believed that school would help them to get a job due to the fact that it gave them qualifications. These students emphasised the importance of gaining certain levels of school certificates that they thought would be necessary for them to gain employment. The next two most frequently given answers were that students gained knowledge and learning from their time at school which would make it more likely for them to gain employment. These students suggested that future employers were looking for individuals who had developed knowledge in their specific employment area and that only those people who have graduated from high school will be considered eligible for employment.
Table 8.4. *Perceived Instrumental Value of Schooling for Gaining Employment*

*Themes Emerging from Student Data*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>School gives you…</td>
<td>(n=661)</td>
<td></td>
</tr>
<tr>
<td>Qualifications</td>
<td>164</td>
<td>24.8%</td>
</tr>
<tr>
<td>Knowledge</td>
<td>109</td>
<td>16.5%</td>
</tr>
<tr>
<td>General Learning</td>
<td>94</td>
<td>14.2%</td>
</tr>
<tr>
<td>Job opportunities</td>
<td>90</td>
<td>13.6%</td>
</tr>
<tr>
<td>Good Grades</td>
<td>67</td>
<td>10.1%</td>
</tr>
<tr>
<td>Skills</td>
<td>49</td>
<td>7.4%</td>
</tr>
<tr>
<td>University Opportunities</td>
<td>26</td>
<td>3.9%</td>
</tr>
<tr>
<td>Work Ethic</td>
<td>26</td>
<td>3.9%</td>
</tr>
<tr>
<td>Success Drive</td>
<td>20</td>
<td>3%</td>
</tr>
<tr>
<td>Good Future</td>
<td>20</td>
<td>3%</td>
</tr>
</tbody>
</table>

Other reasons for valuing schooling in the pursuit of employment were that it created job opportunities, it could give a student good grades which prospective employers would look at, it gave one skills that could be used in a career, it increased one’s chance of getting into university, it instilled in a student a good work ethic and success drive, and it gave one a better future.

Only a small minority of students mentioned the difficulties of gaining employment in the current PNG economic and social climate. Some students
suggested that despite being educated, getting a job would be difficult due to the limited number of official employment positions in the PNG workforce. Others mentioned the large unemployment rate in PNG (82%, see Chapter 2) and the likelihood of them having to survive within a village subsistence-based setting. These opinions are consistent with one of the general aims proposed by the PNG Secretary for Education. As discussed in Chapter 2, due to the extreme unemployment rates in PNG, governmental policy is encouraging students and families against viewing education as a direct pathway to obtaining employment in the commercial sector. Due to the fact that there are 400 times more children leaving school than there are jobs available for them, students are being encouraged to view schooling as being beneficial for a continued village subsistence-based future.

In addition to the issues of limited employment opportunities, some students also mentioned the problems that the PNG wantok system created for individuals seeking employment. One student said that they would not be able to get a job:

*Because nowadays all the jobs are filled up with wantok system in the country [SQ59]*

As outlined in Chapter 2, the wantok system is based around PNG’s cultural obligation to look after their relatives and clan members. Individuals have obligations to help support their direct and extended families, and often workplace, economic, and political decisions are made based on this obligation. Students expanded on the difficulties this system creates for some people:
Well in most cases today I believe it is not always possible to get a job unless you have an advantage of a relative or close friend who is more than happy to employ you if he or she is operating a business or the ‘big boss’ of a company [SQ597]

Whilst these comments reflect the reality of life in PNG, only a small number of students chose to raise them. In general, students expressed positive attitudes about the usefulness of school in helping them obtain employment, and they consistently reported school as being a necessity. Many students commented on the fact that even though there was only a slim (18%) chance of them getting a job, if they did not attend school then there would be a zero percent chance of them getting a job. These hope-filled responses will be explored in more detail later in the chapter.

To summarise, students viewed schooling as playing an extremely important role in helping them to reach their goal of obtaining employment in the future. Although students did not suggest that getting an education definitively leads to getting a job, they did say that one’s chances of getting a job are greatly increased when they are educated. The following section outlines a new goal that emerged through the perceived instrumentality data, whereby students believed that gaining an education will help to survive, live better lives, and stay off the streets.

‘School Will Help Me Stay Off The Streets’

A theme that emerged frequently across the student, teacher, and parent data was the importance of school in helping adolescents to stay off the streets in
PNG. All three groups expressed their opinion that school played a vital role in helping a person to survive, to live an easier and better life, and to stay off the streets and out of extreme poverty in this developing country. This theme was often discussed in conjunction with the previous theme of getting a job. It was frequently suggested that if one was able to graduate from high school, then they would be more likely to get a job, and therefore more likely to stay off the streets.

Two different versions of keeping ‘off the streets’ emerged from the data. For urban students, keeping off the streets literally meant staying off the city streets of PNG (for example the streets of Port Moresby and Popondetta). This involved being able to house themselves and their families adequately, staying away from crime, and earning enough money to provide food for survival as well as health care and future educational activities. An example of this was given by an urban student who said:

*It [school] is important because children nowadays have to have education to be a better person in the future because nowadays we have crimes and everything so you have to be educated to have a job… to live [SI15]*

Similarly another student said:

*Nowadays, especially in the cities, life is very hard there. You live on money not like in the village where there is food there where we can just go and get it. For us, especially in Port Moresby, we have to get good grades to go into universities and a job where we can feed ourselves as well as our families [SI40]*
When village students mentioned the instrumental value of school in helping them to survive and gain a better lifestyle, this almost always referred to escaping the hardships of the village subsistence-based lifestyle. Again, as outlined in Chapter 2, for a large proportion of Papua New Guineans (approximately 86.9%), life is based in their home village-setting communities where access to schooling, health care, technology, and other resources is extremely limited. Villages are separated from these resources because of a number of reasons, including physical separation as a result of the rough environmental terrain, linguistic separation due to the enormous diversity of languages in PNG, and financial separation. Villages make their subsistence living by growing vegetable and fruit crops and harvesting them for their own survival and occasionally to sell at markets if they are accessible. However, this type of living is often difficult, often influenced by uncontrollable forces (e.g., PNG wet-seasons and disease), and can, and often does, result in extreme poverty. Consider the following comment by a village student who spoke of these hardships:

Situation in the village... my village life is very hard... so I want to become... I want to continue for my school so I can become somebody in the near future... to do further studies so that I can improve, like, become somebody or like that in the future time

{SI27}

Likewise, another village student said:
School is very important because... we need to bring some sort of changes to the villages, but because of finance we can’t do this... so school is very important [SI19]

Students often mentioned that they saw school as an avenue to release them from village poverty and to make changes in their communities that would benefit the whole community. One student said that school was very important for her because she believed it would help her to ‘not feel hungry in the future’. Another student said that these were now the times of ‘survival of the fittest’ and that school would help them to obtain a ‘better living’.

Notice that these students did not actually express a desire to leave their village circumstances. Instead they spoke of their desire to alleviate the hardships associated with their subsistence lifestyles. As mentioned earlier, the PNG Secretary of Education promotes the association between education and continuing one’s life in a village-based environment. This is because of the extreme lack of commercial sector employment opportunities. In 1990, the Secretary warned of, and discouraged Papua New Guineans against, unrealistic expectations that schooling would result in obtaining an escape from one’s village and employment in an urban setting. Thus, the results from the current section are promising in that they show an alignment of student goals with the advice of the Secretary. Although students talked of aspiring to job-related future goals and spoke about how schooling can help them achieve these, they simultaneously discussed goals about improving their village’s subsistence-based lifestyle. They commonly mentioned employment paths that were not associated with the commercial sector and that would be useful for village life.
Particularly important, students from the village and rural regions did not express a desire to abandon their home village in order to pursue an urban lifestyle. Rather, they expressed the belief that schooling would increase the likelihood of them contributing to their village and relieving poverty and other subsistence-related hardships.

Students were not the only ones to mention the importance of schooling in helping people to either ‘stay off the streets’ or gain a better lifestyle. This theme was also the most frequently mentioned by parents. Village parents emphasised the importance of their child’s schooling in helping make changes to bring development to their home communities. One parent expressed their desire for their child to learn the necessary skills from school so that they would get a job and help them to ‘survive their living’. Other parents referred directly to the crimes and unemployment that are rife amongst the ‘Raskol’ gangs on the streets of Port Moresby. These gangs are notorious for violent crimes, drug use, and unemployment, and are sometimes a last resort for individuals who have left their village in search of the ‘bright city lights’ of Port Moresby, and who have ended up homeless and jobless. This particular parent’s comment reflected what other parents thought. They said that if everybody in PNG was given an opportunity to attend school and to work then ‘Papua New Guinea would be different… it would be better’.

This view was also held amongst some teachers who encouraged students to be aware of different options in their future and to consider the important role that schooling might play in keeping them ‘off the streets’. An example of this thinking was given by a teacher from an urban school who said:
I think seeing a lot of Raskol activities and stuff like that; it all comes back to school. I mean these are the people who have not had the opportunity to further [their schooling]... maybe no Year 11 and 12 or maybe no Grade 7 and 8. So we read about crime activities. I don’t think more educated students would do such as thing. So in school, we push them in that ‘education is your life’ and you have to ‘whatever you do, put everything into it’ [TI48]

As can be seen, across all interviewed groups, schooling was highlighted as being important in helping individuals keep off the streets in PNG, in seeking better lifestyles, and in surviving the clutches of poverty in a developing country. Students emphasised that part of this survival and improvement of life circumstances involved gaining an education so that they could alleviate certain hardships in the village. Related, however, to such village orientations are family goals and aspirations. The perceived instrumentality of school in helping students to reach their family-related goals will be discussed in the next section.

‘School Will Help Me Support My Family’

As with future goal orientation, the theme of ‘family’ was frequently associated with the perceived instrumental value of schooling. It is important to again note the similarity but distinction between the students’ family goals themselves (which were discussed in the previous chapter), and the value students place on school in helping them achieve these family goals. That is, students believed that schooling would be valuable in helping them support and look after their families. As with future goals, the family theme for the value of
schooling was often discussed in conjunction with other themes. For example, students would often say that school would help them to achieve one particular goal, such as gaining employment, which would ultimately assist them in supporting their family. For example, this rural female student said:

*I think school is important because it's a future. For my case I want to get better marks, better results to go on to university to get a good job and learn, and to look after my parents for what they have done for me.* [SI39]

Similarly, an urban student said that school was very important:

*Because students will learn many things and their educations will go up and they'll work to help their family.* [SI51]

As can be seen in both of these remarks, the value of schooling is often placed at the beginning of the ‘goal pathway’ and helping one’s family is positioned at the end of this pathway. That is, there are a number of steps that students must progress through (e.g., get a job, earn some money) before they view themselves as being in a position where they can help their families. This pathway was consistent across a number of students. Furthermore, schooling was viewed as having inherent value for reaching each of these stages of the pathway.

Another interesting factor that was highlighted during the data collection process was the responsibility that students felt in doing well in school, so that they were able to assist their families. One student spoke of the responsibility she felt in performing well in school in order to create opportunities for her to assist her family. This student described
the fact that she was the only one in her family who had progressed to senior high school, a great achievement and milestone for her and her family, allowing her to ‘bring sunshine’ to her family.

Parents also recognised the importance and value of schooling because of these perceived ‘goal pathways’. Many parents stated their plans for their children to be educated so that they would be in a position to reach certain goals, such as getting a job or going to university, so that they could one day assist them financially. Furthermore, some parents recognised that by learning particular skills that could only be taught in school, students would be more likely to, and in a more capable position to, look after them in the future. This parent summarised the opinions of other parents by saying:

*I want them to learn to speak English, good English, and find something good for themselves for the future and to look after parents like me… like father and mother back in the home [P131]*

Other parents spoke of learning the content of particular subjects and enhancing skills related to relevant community-based projects, as being ways in which their child could assist them in the future.

Another interesting point to be made here are the links between the data presented in this section with the data presented in the previous chapters. Both village-related goals and perceived instrumentality were found to be positively related to student achievement and effort outcomes. That is, students who adopted village future goals, and/or, village perceived instrumentality, demonstrated higher achievement and effort scores. Thus, the emergence of this family village-oriented theme in the current data, suggests that PNG students do
endorse the importance of these village goals and instrumentality, and that these actions will result in positive effects on resultant learning and achievement.

To summarise, school was perceived as having great value and creating many opportunities that place students in helpful positions to provide support to their families. The following section describes the perceived instrumentality of schooling in assisting students with their general goal of gaining more knowledge.

‘School Will Help Me Gain Knowledge’

In the first section of the qualitative analyses, ‘knowledge’ was presented as an individual goal that some students held for their futures, separate from other goals such as getting a job and helping one’s family. The actual gaining of knowledge, good grades, educational qualifications, and skills were all seen as important immediate goals for a student’s future. As with students’ job, survival, and family related goals, students also reported the perceived importance of school in helping them to succeed in their knowledge-related future goals. Logically, examination of student perceived instrumental value responses found that students believed school to be very important in helping them achieve this goal of knowledge. Students said that school would help them to gain knowledge, learn new things, gain an understanding and awareness of the world, and know specific content areas. One example of this was given by this student:

School helps me to speak English well, read a lot of books, [and] it gives me knowledge and understanding so that whatever [isn’t] in my mind, I get it from school, and I help myself. [SI30]
Thus, school was seen as playing a very important function, in helping a student to achieve this goal of obtaining general knowledge. Interestingly, however, in their interviews students expanded upon their goals of knowledge when prompted to think about the specific role that school plays in helping them achieve this goal. Students then went on to talk about two additional categories: speaking and writing English and domain specific subjects.

A number of students mentioned that they thought school was important for helping them to learn how to speak and write English. Although English is the official language of instruction in PNG, the majority of students are not exposed to it until they begin primary school, due to the fact that they are taught in the vernacular (*Tok Ples*) in elementary school. English is often then an ongoing struggle for students. Therefore, many students recognise that gaining a solid command over the English language, and the important role that this can play in one’s life, is an important by-product of their schooling. Consider the following comment:

*Well I think all children should attend school courses. I think it’s best for the future. They need to know how to read and write, and speak English.* [SI36]

Some students expanded upon this idea and discussed how their command of the English language gained through English classes, and how other domain specific subjects, were perceived as being helpful to them in attaining other goals, particularly specific, personal, occupational goals. Students mentioned mathematics and science subjects as being helpful for careers such as engineering and technology, whilst commerce and economics related subjects
were seen as being helpful for running small businesses and entering into the popular career of accounting. For village students, subjects such as agriculture and home economics were seen as being useful for village development and sustainability. Furthermore, mathematics, English, science, and economics were seen as the most useful subjects for obtaining a certificate upon graduation for and for getting into tertiary education institutions. Subjects such as expressive arts and history were not seen as being very useful for attaining future goals and students spoke of their resulting dislike for and lack of relevance of these subjects.

Some parents and teachers also discussed the value they place on the importance of school in helping their children and students to increase valuable knowledge and skills bases. Parents in particular said that in doing so, students would be placed in a position where their achievement of other important future goals, such as getting in to university, would be more likely if they had this knowledge base to draw on.

To summarise, school was logically seen as being extremely valuable for the attainment of future goals relating to knowledge, skills, and language acquisition. The next section discusses students’ perceived instrumentality of school in reaching goals concerned with becoming somebody successful in the future.
‘School Will Help Me To Become Somebody’

Students also commented that schooling was valuable to them for reaching their goal of ‘becoming someone’ in the future. Students on many occasions said that attending school, getting good grades, and performing well in class, were valuable in helping them to ‘become someone’ or become successful in their future. An example of this perceived instrumentality of schooling for achieving this goal was given by a student from a remote village in PNG:

*In the future, I wanted to become somebody, and to be the best in class helps you to do that.* [SI2]

This was further supported by a rural student:

*Do people that I know think school’s important? Yeah, they think school’s important because it’s the only way they get to become someone in the future.* [SI43]

When prompted, students would expand on this theme, using the same ‘pathway’ of goals that they used when talking about other goals such as family and community orientations. That is, students reported that school was valuable in helping them to gain an education, increase their chances for employment or the ability to earn money, and increase their chances of becoming a ‘successful’ person in the future.

Interestingly, students tended not to mention specific aspects of schooling when discussing this goal, such as the acquisition of language and other skills. Rather, they spoke in general terms such as ‘graduating from school’ and ‘completing their education’ as being helpful for becoming someone in the future. This may be because the theme of overall ‘success’ in one’s future is a
general one, therefore resulting in students’ use of general terms when describing the value of schooling.

Summarising this section, education was perceived as being useful to students for achieving these specific success related future goals. The following section outlines students’ value of schooling in helping them to reach goals related to further studies and tertiary education.

‘School Will Help Me Get Into University’

It was common for students to highlight their thoughts that graduating from high school was especially important and necessary for their goals of getting into and completing university. Again it is necessary to notice the links between but distinction of the future goal itself of going to university and the perceived instrumentality of school in assisting one’s chances of getting into university. The majority of student comments surrounding the perceived instrumental value of schooling in helping them get into university were based around getting good grades and qualifications. Also, as with the goals of getting a job and earning money, university was often mentioned as a pathway for achieving other goals such as looking after one’s family and having a better lifestyle. University was also discussed as being useful for reaching the goal of attaining knowledge and a wider skills base. In addition to this, some students discussed the fact that they did not want their past learning to go to waste and to not be used again in the future. University was identified as one means by which students could apply past learning. It was viewed as an opportunity to expand
upon the subjects that they had taken interest in during high school so that they could then apply this learning in an effective and practical way in their lives.

Some students, however, mentioned the problems associated with the limited number of university spaces in PNG and stated that they ‘have to work extra hard to get good grades’ so that they ‘can get to university’. So whilst the role that education plays in helping one get into university in PNG was clear, it was also identified as difficult and challenging.

In addition to university, some students discussed further study in general, and how they believe the effort that they currently put in to their schooling and the marks that they receive, will influence how far they can go in their studies. Like university, places in PNG senior secondary schools (Grades 11 and 12) are limited and achievement based. Therefore it is helpful for students to recognise the value of their current schooling experience in contributing towards their progress throughout their high school years.

The data clearly indicated the perceived link between education and the resulting goal of further studies was evident and clear for PNG students. The following section outlines the perceived instrumental value of school in assisting a student to earn money in their future.

‘School Will Help Me Earn Money’

Students also mentioned the importance of schooling in helping them to earn money in the future. Again, this was often associated with other goals such as getting into university or getting a job. When asked how important school was to earning an income, one student strongly emphasised:
Very important. Money. We can’t deny the fact. Actually, I’ll tell you my piece of mind. Every student in PNG goes to school because they want to get a job and earn a living. That’s a fact!

[SQ781]

Again, many students mentioned the importance of school in giving them skills and qualifications to earn money so that they can repay their parents for their school fees. Some students also discussed their obligation to support their parents and siblings in financial matters and their role as they mature to become the ‘bread-winner’ of the family. They highlighted school as providing the necessary means for achieving this goal of repayment.

A small number of students also suggested that doing well in school was not the only way in which a person would be able to make money. Although these students did say that having an education would make it easier to earn an income in the future, they said that it was by no means the only way. These students stated that uneducated people in PNG can still earn money through jobs such as agricultural farming, selling goods at markets, and providing services such as house cleaning (for those living in urban areas).

To summarise, for the majority of students, school was seen as pertinent and valuable for their goals of earning money. A small number of these students, however, did recognise that school was not essential for the attainment of this future goal. The next section examines students’ perceived value of schooling in reaching future community-oriented goals.
‘School Will Help Me Help My Community’

Some students with community-oriented goals also mentioned their perceived value of schooling in helping them achieve these goals. Some students spoke in general terms about the usefulness of school in helping their communities. Others spoke about specific aspects of school that they thought they could translate to their home communities. One student, who was attending a rural school but who originally came from a remote, village community, reflected his ideas about how school could help him to make a difference in his home community:

*The things that I’m learning, they help me. Like when I go back to the house or my village, I will apply what I learn from here. For example, like I will learn from physics, pieces like electricity. Some of the ideas they I got, I will go to my people and then, like when we build a house and try to put electricity in, then I can, with the knowledge that I have, fit [it] in.* [SI34]

This same student went on further to say:

*Most of my people, they live in the village life and they don’t know about these things because they have cultures. So, as I [am] exposed to this education about this electricity, when I go back and I help them, they will understand. They are excited and they, what will I say, they will you know, support me and give morale for me to learn more about this thing.* [SI34]

These comments are also promising in light of the comments mentioned earlier by the PNG Secretary of Education who emphasised the need for the
encouragement of students to return to their home communities after they had graduated from school. Many students spoke about strong desires they felt to make such decisions in their lives and to plan to return to their communities to assist them with the knowledge and skills they had learnt during their time at school. Furthermore, no students, parents, or teachers spoke of the sometimes reported ‘alienation’ that individuals might feel from their home communities after they had been away at school for a period of time. As outlined in Chapter 2, some research has suggested that Papua New Guineans who engage in Western schooling (often meaning they must leave their home village and live on campus at a national or provincial high school), experience alienation from their communities when they return (Demerath, 2000; Zeegers, 2005). This can result in a population of educated and credentialed, but unemployed and socially disenfranchised individuals. Whilst the findings of the current study suggest no evidence of this occurring, it is necessary for future research to examine this phenomena specifically and in greater detail, by specifically collecting data at the community level from returned students. This will be discussed in further detail in the following chapter.

In addition to the students, some parents also emphasised the importance of school in helping their communities. They mainly spoke of the fact that educated and trained students could bring development to their communities and, as one parent stated, ‘change our way of living’. Other parents spoke of changing their village subsistence-based lifestyle to a ‘modern form of living’. As the role of technology expands its influence over lives in developing countries, more and more communities are made aware of modern lifestyles. Despite many PNG
villagers’ lack of access to resources and factual information about the practicalities of such lifestyles, many still appear to aspire to ‘modernise’ their lifestyles. Thus, village parents spoke of their children’s roles in attending school (often in a different region to the home village) and returning one day to help the community with their knowledge, skills, and modern resources.

In addition to community instrumental value, some students spoke more generally about how school is important on a broader, societal level. They said that school was important:

Because at this time the world is modernised. We need an education so that we can keep up with other countries and communicate with them through what we learn. [SI34]

Other students conveyed their opinion that educated school leavers will play beneficial roles in helping their nation as they will be able to go into leadership positions on political and social levels.

In summary, students and parents both expressed beliefs that schooling is important for attaining community related future goals. Both groups discussed the advantages of school and education in increasing their community’s access to knowledge, resources, and the many practicalities of modern lifestyles. The next section examines the future goal of obtaining personal goals and the role that school and education play in helping one achieve these goals.

‘School Will Help Me Reach My Personal Goals’

The final goals that students discussed the value of schooling for were specific, personal goals that they hold for their futures. Some students conveyed
their views of the importance of school in helping them achieve ambitions that they have created for themselves. Consider an example from the following student:

*To me it's [school is] really important. So I come here and learn as much as I can. So the subjects I like, for my long term ambition, would be important. I learn as much as I can for them.*

[SI16]

In addition to these general ambitions, students also discussed school as being valuable for attaining specific occupations such as getting into medicine and being an accountant.

This theme of perceived instrumentality for specific future goals was also often mentioned in combination with other factors that motivated students to try hard at school. This combined influence of the value of school and the resulting effort a student applies to their studies will be discussed in greater detail in the coming sections.

**Summary**

This section has examined student, and some teacher and parent responses, to interview and open ended questions asking them about their perceived value of schooling in helping them attain future goals. The same eight goal categories were examined in this section as in the future goal orientation section since the two psychological variables are inherently linked. Thus for, each future goal espoused by PNG students in the previous section, they were
asked whether they believed school and receiving an education was important to them for reaching that goal. In addition to the eight goals that emerged in the previous section, the perceived instrumentality of school, for achieving an additional and important goal of ‘keeping off the streets’, was discussed.

Before the other psychological variables that were investigated in the quantitative chapters are discussed, one further question was asked of students in regards to the importance of school in their lives. Student responses to this question were interesting and evocative, and highlighted many of the realities of PNG life. These responses are presented in the following section.

**What If No School?**

Students were asked in their semi-structured interviews, ‘if a child doesn’t get to go to school, what will they end up doing in the future?’. This question was powerful in its elicitation of informative answers and students’ responses were often in line with the goals they said they had for themselves for the future (discussed earlier). Many students mentioned that not going to school would result in a person becoming unemployed or employed in what they referred to as a ‘low job’. One student said:

*It stops them from getting like good jobs that require specific things that people have learned at school.* [SI13]

Students from urban areas mentioned that they thought a person without education would end up as a shop assistant or a cleaner. They referred to these occupations as ‘low jobs’. A typical example of this was given by one of the rural students who said:
They’d miss out on a lot… and good jobs and good money and good living. They’ll end up back in the villages just sweating out their… um… working in the gardens and it’s very hard sitting and selling at the market all day [SI37]

Following on from this particular student’s comments, many other students also mentioned the fate of children, who do not have schooling opportunities, as being one in the village. A number of students said that people who are uneducated will end up back in their home villages, trying to survive off a subsistence-based lifestyle, and not making a contribution to enhancing their difficult lifestyles. Some students said that the only option for them if they were not educated would be to ‘stay back in the village and help [their] parents and do the garden’. Students from a remote village said:

They will spend most of their time in the village, maybe doing gardening or helping their parents doing gardening, or otherwise they’ll do the trekking… those ones that carry the bags [SI119]

Trekking is one source of income for villagers who live along the Kokoda Track. Trekking companies employ men to act as porters for tourists who embark on this significant journey and other villagers often attempt to make an income from selling food and providing huts as accommodation for the trekkers. The trekking season, however, is irregular, is influenced by the infamous PNG tropical wet season and is also influenced by the volatility of local rivalry and violence. However, a small number of village people are employed to help trekking companies. More and more though, trekking operators are expecting their employees to have a minimum level of education so that they can communicate
with trekkers, inform them of the cultural and historical significance of the
Kokoda Track and assist with the running of the business. Thus, school seems to
be necessary for employment and jobs that previously did not require education
as a pre-requisite.

Some students (mainly urban and rural students) spoke of the problems
associated with crime, violence, drugs, and unemployment in PNG’s cities. A
number of students said that if a child does not complete their education, then
life on the streets of Port Moresby was inevitable. An example of this was given
by a rural student:

_If they don’t go to school, like, they will find life difficult. So when
life is difficult they will go back to the street and then join the
other gang and they will start to form… ah, criminals. Thieve and
then steal around and stuff like that… for their survival. [SI34]_

Expanding on this idea and reflecting the majority view, another student said:

_If the child doesn’t go to school he’ll be left homeless. He won’t
be able to get a decent job or something in the system of
education. So it will be very difficult for that child, so as a result,
the child will be on the streets they will. [SI40]_

Other students mentioned people turning to alcohol and drugs when not in
school:

_If you don’t go to school, then in the future you might struggle a
lot. Like no job and stuff. Some of them may end up in the streets,
stealing and doing robbery and stuff like that. Smoking drugs._
_[SI16]_
Finally, another theme that students discussed regularly was the missing out on certain skills and knowledge areas that are viewed as being valuable for one’s future. One student, when asked what a child would miss out on if they did not have an opportunity to go to school said:

_They’ll not have good knowledge… their brain will be dull_ [SI28]

Other students spoke of not developing skills and language such as learning how to read and write English and perform mathematical calculations. An illustration of this was given by the following student:

_If that child doesn’t go to school then they’re missing out on a lot. For instance, nowadays we need to go to school at least to know how to speak and write. If you don’t, then the other children are learning, and you are just missing out on a lot._ [SI35]

Other students suggested that not going to school resulted in a person missing out on learning how to read, whilst others said that they would miss out on learning basic life skills. Developing good behaviour, respect, obedience, and goal setting skills were also reported by students as things you must learn from school.

Students were aware of the social, economic, and environmental realities of their lives in PNG and reported a number of negative outcomes that would be the outcome for someone who did not complete their schooling. When asked what the outcome would be for a child with no education almost all students mentioned negative consequences. Thus students place great value on their schooling and believe that it is the path to achieving the many goals that they set for their future. One interesting point to make is that twenty-nine out of the
thirty-two students who were interviewed were currently enrolled in school. Only three students were currently not attending school so it is possible that the findings were biased towards the positive effects of schooling. The three students, however, who were not enrolled in school (all due to financial troubles in paying school fees) still spoke of school in a positive manner and believed that their education thus far would help them to achieve the goals they had set for their futures. All three expressed a desire to re-enrol in their school and graduate from Grade 12.

The current section has examined students’ perceived instrumental value of schooling, as well as their beliefs surrounding the lack of opportunities available to students who do not have the means to obtain an education. The next section examines students’ current motivational goal orientations, and the immediate aspects of their schooling that encourage them to apply effort.

**Motivational Goal Orientation**

Students were asked in the interviews to talk about what types of immediate influences they had in their lives that had an impact upon how motivated they are at school. In the previous two chapters, analyses were performed to highlight the relations between three main types of goal orientations – mastery, performance, and social goals, and their interaction with other psychological variables and academic outcomes. In the current analyses, without directly asking students whether they were oriented by mastery, performance, or social goals, these three themes still emerged from the students’ responses. Many of the students gave responses that coincided with the
motivational goal orientations that were examined in the quantitative analyses and some spoke about the positive and negative roles that such goals have on resulting academic behaviours such as engagement and effort. In addition to these three goals, some immediate goals that were not addressed by the quantitative questionnaire emerged through the interview data. All goal orientations will be discussed and examined further in the following sections.

**Goal Orientation Frequencies**

Students provided responses discussing their motivational goal orientations across mastery, performance, and social categories. Corresponding to the quantitative data, for the mastery category, task and effort themes emerged from the data. Similarly, for the social category, students’ responses highlighted social concern and affiliation orientations. However, interestingly, a third social category emerged from the data that was not specifically targeted in the quantitative study. This was the social goal of sharing. A performance goal orientation also emerged from the data; however, only the competition factor (one of the four quantitative themes) was consistently discussed. Some students also reported an immediate goal of getting good grades. As described in the literature, this can be seen as relating to both a performance orientation (where the grades themselves act as an extrinsic reinforcer) and a mastery orientation (where the good grades represent the result of an intrinsic orientation). Finally an additional goal orientation category emerged for the PNG students. Many of them spoke about being motivated in their current schooling experience because of being grateful for the opportunity and because they identified the need to
repay their parents for this opportunity. In addition to these student themes, teachers specifically mentioned a further two goal orientations that they noticed in their students – leadership and small-group learning.

Table 8.5 displays the frequencies with which students, teachers, and parents reported these motivational goal orientations. Each theme will be discussed in the following sections when student, teacher, and parent data will be presented to highlight the nature of these orientations.

Table 8.5. *Motivational Goal Orientation Themes Emerging from Student, Teacher, and Parent Data*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Responses (n=32)</th>
<th>Teacher Responses (n=11)</th>
<th>Parent Responses (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery</td>
<td>21 (65.63%)</td>
<td>7 (63.64%)</td>
<td>4 (44.44%)</td>
</tr>
<tr>
<td>Social Concern</td>
<td>14 (43.75%)</td>
<td>3 (27.27%)</td>
<td>1 (11.11%)</td>
</tr>
<tr>
<td>Affiliation</td>
<td>21 (65.63%)</td>
<td>7 (63.64%)</td>
<td>4 (44.44%)</td>
</tr>
<tr>
<td>Sharing</td>
<td>14 (43.75%)</td>
<td>6 (54.55%)</td>
<td>1 (11.11%)</td>
</tr>
<tr>
<td>Performance</td>
<td>18 (56.25%)</td>
<td>5 (45.45%)</td>
<td>-</td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good Grades</td>
<td>6 (18.75%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Future Goals</td>
<td>9 (28.13%)</td>
<td>2 (18.18%)</td>
<td>-</td>
</tr>
<tr>
<td>Repay/Gratitude</td>
<td>5 (15.63%)</td>
<td>2 (18.18%)</td>
<td>-</td>
</tr>
<tr>
<td>Leadership</td>
<td>-</td>
<td>2 (18.18%)</td>
<td>-</td>
</tr>
<tr>
<td>Group Learning</td>
<td>-</td>
<td>7 (63.64%)</td>
<td>-</td>
</tr>
</tbody>
</table>
Goal Orientation Themes

Mastery Goal Orientation

A large number of students espoused the adoption of mastery and intrinsic goal orientations in their schooling. These goal orientations were concerned with engaging in current tasks due to interest, a desire for understanding, and enjoyment of learning. In addition to these overall mastery goals, some students endorsed task mastery goals, whilst others reported the adoption of an effort motivational orientation. Students who were task oriented often mentioned their enjoyment of school, their interest in the subject material, and their monitoring of their improvement in class. One example of these thoughts was given by a student who mentioned his enjoyment of gaining extra knowledge because:

*I broaden out my mind, so that some of the things that I never learn would be there [SI34]*

Another student spoke of her enjoyment of school in combination with her control over her progress:

*I think I am enjoying every bit of it [school]... It depends on me. I must make it my business to learn everything I can. [SI38]*

Other students emphasised the pleasure they gained from learning new material, that they had not been previously exposed to, and in ‘widening their knowledge’.

Students also discussed being motivated by effort goal orientations. Students spoke about ‘trying their hardest’ in school and putting in a great deal of effort to learn new things. Parallel with many of the effort quantitative
questions, one student spoke of her attitude when she was confronted with difficult work:

If [I] see the subjects are difficult, I try to go about it. Try to just study and work together well to get it [SI46]

Another student reflected the view of the majority of effort-oriented students when he spoke of his classroom efforts:

I try very hard. I must try my best at school to know, to get the knowledge that my teacher gives me. I must try my best. [SI28]

This effort orientation was also highlighted when students were referring to external goals and pressures in their life, as well as in reference to the goals they set for their futures (discussed earlier). Students often mentioned that they were motivated to put effort into their schooling, and that this motivation stemmed from these external sources. For example, some students (particularly from village regions) mentioned their desire to put extra effort into their schoolwork so that they might be relieved from some of the economical and environmental pressures that they currently experience and expect to continue to experience in the future. The following student gave an example of this:

Living here is very difficult. That’s why I want to try my best. To earn my living because the situation here is very hard. [SI19]

Other students spoke in general terms about their goals and ambitions for the future as motivating them to try hard. This student said:

The goals and aims that I have for the future, that’s the thing that makes me want to try hard to achieve those aims and goals in the future. [SI38]
To summarise, a number of students mentioned mastery related motivating influences in line with both task and effort oriented goals. As reported in Chapter 7, these mastery orientations were positively predictors of student outcomes, especially for those students who endorsed task orientations.

Teachers and parents also spoke of student mastery goal orientation when asked about the motivation of students in school. Teachers spoke about task and effort goals when discussing those students who perform well academically in their classes. One teacher when verbalising what he thought a good student’s motivation would be, said:

*I’m focused. I want to work towards it. It’s like you have the goal already there. What you have to do is you have to work hard to achieve it. You set yourself up on this already. You work towards it.* [TI48]

Another teacher mentioned her good students’ ability to monitor their progress and understanding of content material and to use learning from their mistakes as motivation for future effort. This sentiment was reinforced by a number of other teachers.

Some parents also spoke of mastery orientation in their children. Parents mentioned that their children try to improve their schoolwork and apply their best effort, and that when they see good results, they are motivated to try even harder. Parents also suggested that these types of orientations were positive and resulted in a student getting better grades and applying more effort in their homework and schoolwork activities.
As shown in the above discussion, mastery goal orientation themes emerged across student, teacher, and parent data and were viewed as important types of motivation for a student to hold in the schooling context. Both the task and effort mastery themes emerged and both of these categories of goals were acknowledged as playing a positive role in a student’s educational progress. The following section presents data on students’ social motivational goal orientations.

**Social Goal Orientations**

Through the interviews students also reported that they were motivated by social goal orientations. In Chapter 7 the relations between students’ overall social goals, two specific types of social goals, social concern and affiliation, and student outcomes were examined. In these prior analyses, when an overall higher-order factor of social orientation was examined, no significant relations were found between social orientation and student outcomes. However, when the two types of social goals were examined individually, it was found that the two goal types predicted student outcomes in opposite ways. Whilst affiliation goals had significantly negative effects on achievement, social concern goals had significantly positive effects on these same outcomes.

Upon examination of the current chapter data, these two types of social goals emerged on a number of occasions. Furthermore, students’ discussion of these goals shed informative light on the opposite relations that were found in Chapter 7 between them and student achievement.
The main theme that emerged when students were talking about the first type of social goal, social concern goals, was that helping other students in their schooling ultimately resulted in their own more advanced understanding of the subject matter. Students used terms such as ‘at our level’ and ‘we can understand each other’ when referring to social help. An example of this was given by this student:

*If we discuss with our peers, like we can explain to them, or understand them, in a way we understand.* [SI16]

Similarly, other students said:

*When I find it difficult in my school works, I must go and ask my friends. Or, something that I know I must go and share it with my friends. Explain it to them ‘do this’.* [SI28].

The other advantage that students identified, as a result of being concerned for their friends in school, was that of reciprocity. That is, many students reported that if they helped their friend on one occasion then it was more likely that they would be helped in return on a different occasion. Consider the following comment as an example of this:

*Everyone gets to help each other. I like it, because they help me if I don’t understand things, ‘cause I don’t know some things but my friends do. And like if I help him, he returns the favour and helps me.* [SI13]

On other occasions, students also suggested that the help that they provide to each other when experiencing language and translation difficulties played a positive role in assisting their understanding and engagement with their
schoolwork. Students said that on some occasions, when they did not understand their teacher due to language miscommunication, one student would translate the information into *Tok Pisin* or their vernacular language. In doing so, students are able to aid each other’s understanding of their teacher’s instructions and subject material. These results suggest that adopting a social concern goal orientation was reported as being helpful to students because it: (a) increased student understanding; (b) increased the chance of reciprocity; and (c) allowed for language and other communication problems to be overcome.

Social concern goals were almost always mentioned as having a positive influence on students’ experience in the classroom. Students’ discussion of *affiliation* goals, however, was ambivalent. Some students spoke of the enjoyment they received from working closely with their friends at school, but many students also reported the negative influence that social affiliation can have on student outcomes.

One student when highlighting their positive experiences of student interaction in their engagement with school said:

*You come to school, you learn new things, and you have people who care about you at school. So it makes you more, you know, interested to come back to school every day to meet the people. [SI115]*

Other students spoke of the encouragement that their friends provide them with when they are around each other at school. Nevertheless, they did not directly mention academic support when referencing such sentiments that acknowledged the positive effects of social affiliation on student aspects such as self-esteem
and the creation of a supportive, friendly environment. These comments were
typical of students who endorsed the positive influences of affiliation goals.

On the other hand, many students also recognised some of the negative
effects of having their friends around them at school. These negative effects
came about as a result of distraction and lack of concentration, noise created in
the classroom environment, and lack of teacher control and input. An example of
students’ thoughts on this can be seen in the following discussion:

*Small groups like… the bad thing about it is you won’t concentrate a lot because there’s too much [distraction] and you cannot participate with the teachers. The big [whole class] group, there’s always quietness and you listen what you are doing and you do things that are right [SI30]*

Some students also highlighted the fear and embarrassment they
associated with working with friends and having to provide input into group
work. One student said that they thought constant affiliation with other students
might lower their own intelligence level and have a bad influence on their
achievement outcomes. Despite these few students, the majority of students
spoke about the distraction provided by working with friends in a group setting
as being the key negative issue with peer affiliation, rather than the fear and
inadequacy they felt in these situations.

These responses seem to provide a further understanding of the positive
relations between social concern goals and achievement and the negative
relations between affiliation goals and achievement that were found in the
previous chapter. From the current data it was found that students identified
mainly positive outcomes associated with the concern goals, whilst they reported a mix of the positive and negative effects of affiliation goals. Therefore, when examining the influence of social goals on student effort and achievement outcomes it is important to examine them at the first-order level. That is, there is more explanatory power in examining the separate influences of the two types of social goals.

One other social goal that emerged from the qualitative interviews (that was not directly measured by the quantitative questionnaire) was a sharing goal orientation. A number of students discussed the sharing of ideas and school and extracurricular interests, as well as the sharing of their practical belongings. An example was given by this student:

*We do a lot of sharing and it’s what makes our school a family school and a better place of learning* [SI15]

Furthermore, this student highlighted the theme of sharing ideas and interests:

*Working in a whole group is like… You share your ideas together. Like whatever you have in mind you just take it our and that’s a good way of learning together… Sharing ideas.* [SI38]

Teachers expanded on some of the reasons behind the students’ desire to share at school. An example of teacher’s observations is seen in the following teacher comment:

*Sharing and working together is one of the Melanesian sort of… something that Melanesians do most. One of the aspects of life. So you know since we are Melanesian, there’s no problem with sharing. Sharing and cooperation in the community and even in*
the school. They do share lunch, they do share ideas and stuff with each other, and for the smaller ones, if they're not sure of things, concepts and problems, they do go to the older ones and seek assistance. [TI24]

This same teacher went on to say that he thought that this attitude of sharing and cooperating needed to be maintained because of family and cultural responsibilities. Other teachers suggested that the sharing of ideas and objects reduced feelings of greed and selfishness, increased lateral and creative thinking, and resulted in collective and mutual learning. Parents echoed teacher sentiments about the encouragement of sharing in the educational setting and also acknowledged the benefits associated with students assisting each other with their learning. Thus, sharing goals were viewed as serving an important role in the academic and social lives of students by both student, teacher, and parent participants.

This section has outlined and presented data on students’ social goal orientations, including social concern, affiliation, and sharing goals. The next section will present a discussion of the data that highlighted performance goal orientations in students’ learning experiences.

Performance Goal Orientation

Next, students’ performance goal orientations were examined in the interview data. Before a discussion of these goals takes place it is necessary to again highlight the position that one can simultaneously hold multiple goals, even goals that seem contradictory on one level. As outlined in Chapter 3, recent
research has supported a *multiple goals perspective* whereby it is possible for
students to simultaneously pursue mastery, performance, and social goals
(Dowson & McInerney, 2001, 2004; Thomas & Barron, 2006; Urdan & Maehr,
1995). These studies have suggested that students’ social goals are likely to
interact with both their mastery and performance goals, and that it is the
combination of the adoption of a variety of these goals that ultimately influences
academic outcomes. Therefore, it is possible to simultaneously endorse goals
that by definition might appear to be contradictory in nature. For example, clear
distinctions can be made between certain types of performance goals, such as
competition and power, and social goals, such as sharing and concern. However,
consistent with the research presented above, the same groups of students in the
current analyses often spoke of adopting both social goals and performance goals
at the same time, and emphasised the fact that these goals are not mutually
exclusive. One student gave an example of this when she said that she was
motivated by performing better than her peers, but that she also saw value in
helping her peers and sharing her knowledge with them so as to assist both
herself and her friends in their class work. The following sections examine the
performance goal orientations that were discussed by students’ as playing an
important role in their learning and achievement processes.

Upon analysis of the data, it was found that students seemed to endorse
only one type of performance goal orientation - a competition goal orientation.
Students’ sentiments surrounding their endorsement of competition goals were
mixed. Whilst the majority of students endorsed the goal and mentioned the
positive benefits of being motivated by peer competition, some students either
mentioned the negative effects of this type of orientation or said that they did not adopt this type of orientation.

Students who believed that adopting a performance orientation has positive benefits for their schooling suggested three main reasons underlying this. Firstly students stated that by competing with fellow students they would become ‘inspired’ and ‘motivated’ to achieve better results and to reach a higher standard of achievement. An example was given by the following urban student:

*It [competition] helps us to do well because if we will see others getting a higher mark than us then I think it inspires us to beat them next time so that we get higher marks [SI14]*

Another student spoke of her desire to move to a higher-achieving class:

*There’s a really big competition between me and my fellow classmates because we want to get up to 11.3. You want to get out of the [lower] class and you have to get really good marks to get up. So it [competition] really motivated you to work hard. [SI43]*

Secondly, students reported that competition aided their understanding of the subjects they were learning at school, because it motivated them to apply effort in their studies, and to learn more. Many students echoed this sentiment:

*It’s [competition] a good thing… you learn to do better. You learn to compare to the other students. It’s helping me to learn and it’s helping me to understand. [SI11]*

In a similar fashion, another student spoke of the increased effort he applied because of this orientation. This also reflected student performance oriented thought:
It’s a good competition. It helps me to learn because when I see the marks of the students, I want me to… I can beat them and be like them, so I have to try my best to go up to them. [SI34]

Thirdly, students highlighted the resulting pride they felt as a result of competition, especially when they saw themselves as doing better than their peers. Students spoke of this pride in a positive light. Some students reported their desire to ‘prove to their friends’, their family, and themselves that they could achieve at school and they discussed the resulting pride they experienced when they did this. For instance, this student said:

I feel you know proud in myself, yeah pride in myself, if I’m doing much better than that other person. That’s the good side of it [competition]. [SI33]

Many students also spoke about competition at different levels and in different contexts. Performance competition goals were adopted by students within their classroom settings (i.e., competing with their peers) as well as in their home environments (i.e., competing with their siblings). An example of this was given by this urban student:

My mother makes us compete. If I don’t do good work on my own, and my sister does better in her work, my mother tells us that we have to compete, and I have to work harder than my sister, and she has to work harder than me. It does sometimes [help me]. I think of my sister and she’s doing higher, or I think about my education and I just try my best. [SI12]
Thus, many students spoke favourably of their competition goal orientations. However, some students also reported that they did not adopt competitive orientations whilst others said that depending on the context they would sometimes endorse competition and sometimes avoid it. For example, this student emphasised her adoption of social and mastery goals over performance goals:

*We just like learning and sharing ideas. So we don’t compete. We just look through our things together.* [SI15]

Many of the village students interviewed spoke of their reluctance to share their results and compete with their peers. One student reflecting this said that he would never show his marks to his friend because he prefers to keep them a secret. He went on to say that he would share his marks with his family and accept advice to try better than his peers from his parents, but that he would not show any other people. One student honestly stated:

*If we get a better mark, we’ll show it to our friends. If we get less, we won’t show it to our friends!* [SI6]

Thus there seems to be mixed evidence as to the effectiveness of competition goal orientations. However, the majority of students who did endorse performance competition goals mentioned their favourable support for them and the positive influence competitive behaviour can have on a student’s motivation in the classroom. In addition to the data presented in this section, it is interesting to note that the quantitative analyses found that endorsement of competition goals in the school setting were not related either positively or negatively with achievement and effort outcomes. Some other performance goals
(e.g., praise and social power) appeared to be negatively related to student outcomes. These themes, however, did not emerge in the qualitative data analyses and therefore require further investigation.

One other motivating orientation discussed by students, which has links with competition goals but also with mastery goals, was a *good grade* orientation. Some students reported being more motivated in class when they were receiving good grades, and that evidence of these good grades encouraged them to work harder. One student specifically reported that when she could see that her grades were not good this made her work harder. This type of orientation can be viewed as related to both extrinsic and intrinsic motivation. Whilst the actual presence of the grades acts as an extrinsic reinforcer, the grades also represent effort and achievement and therefore can result in intrinsic reinforcement. These relations will be discussed in more detail in the following chapter.

Finally, teachers only discussed two additional types of motivational goal orientations. A small number of teachers discussed the theme of student leadership as playing the role of a motivating goal for students. They mentioned that high achieving students when placed in a group setting are motivated to take on leadership roles because they saw this as evidence for their achievement and understanding of the learning material. However, no students mentioned this orientation even when prompted to talk about the roles and advantages they experience when involved in group-work.

Teachers also highlighted the motivating goal of being involved in group-work. Without specifically discussing social helping, sharing, or affiliation, they
suggested that the actual experience of group work and the dynamics experienced when working in teams was a driving force in students’ effort and cooperation at school. An example was given by one teacher who said:

*When they get to be in small groups everyone is challenged to work and cos it’s a small group everyone will work.* [TI17]

Teachers also commented that students learn better and more effectively in small groups because they are given opportunities to feel comfortable to discuss issues and topics openly.

To summarise, this section has examined student, teacher, and parent beliefs about the role and prevalence of performance goal orientations in students’ academic lives. The final motivational goal section discusses other goal orientations that do not officially fall under the banner of mastery, social, or performance goals.

**Other Motivational Goal Orientations**

In addition to the mastery, performance, and social goal orientations that were examined in the previous two chapters, an additional motivating theme emerged from the interview data, which corresponded to a *family* goal orientation. Students regularly emphasised three motivating factors that were associated with this family goal orientation. Firstly, students spoke about their gratitude for their schooling opportunities. By understanding the reality of the limited number of educational opportunities in PNG, many students reported their gratefulness for their enrolment in school, and expressed that this was
therefore a motivating factor for their effort in class. An example of this was
given by a student who said:

*The important thing I like about being in school is like it’s an
opportunity for me. So I have to make use of it. When the
opportunity is over, then that’s it.* [SI46]

Another student said that they tried very hard at school because they realised that
they were at one of the best schools in Port Moresby and that they were ‘lucky’
to be there.

Teachers also commented on this gratitude orientation in their students.
For example the following teacher reflected on one of her students at school:

*And I can see that, you know, for him it’s like an opportunity. It’s
like a privilege for him to be back in school. So I can see that he’s
just putting everything he can, you know, into it.* [TI17]

The second family orientation related goal was the repayment of one’s
family. Students often reported that they were motivated to work hard and do
well at school because they wanted to one day be in a position to repay their
parents for the investment they had made in their schooling experience. Many
students reported goals such as the following:

*What makes me try hard is… I think of myself, like who am I
gonna be in the future, and I also think of my parents and
everything they’ve done for me. I need to repay them back when I
get a job.* [SI39]

The third motivating goal that was related to this family orientation was
that of living up to parent expectations. Many students highlighted the fact that
they did not want to disappoint their parents or their extended family in the efforts they applied at school. Some students used terms such as not wanting to ‘bring shame’ or ‘humiliation’ upon their families if they did not try hard at school. This student reflected this theme and said that they tried hard in school and wanted to achieve:

Because after coming this far it would be a disgrace to fall out at the end. [SQ669]

Another student stated that doing well in school:

is really important, because I was not born and brought up in the village, so I can’t go back. If I go back I will make my parents embarrassed who are travelling overseas [after leaving the village] [SQ44]

Finally, some students spoke specifically of having to live up to their parents’ expectations and making their parents proud of them. These were seen as motivating factors for applying effort at school.

Thus, a family goal orientation was also expressed as playing an important motivating role in students’ immediate achievement tasks. The main three motivating factors of these family goals were to show gratitude to one’s family, to repay one’s family, and to live up to one’s parental and family educational expectations.

**Summary**

This section has examined students’ motivational goal orientations in the school setting using themes emerging from student, teacher, and parent data. A
number of the goal categories that were examined in the quantitative analyses emerged from the student, teacher, and parent responses. Mastery, performance, and social goal orientations all emerged in the analyses; however, for performance goals, only competition was discussed in meaningful detail. Furthermore, a number of additional goal orientations emerged from the data analyses that were not examined in the previous two chapters. The social goal of ‘sharing’ was highlighted, as well as the goal of ‘getting good grades’ that was related to both performance and mastery orientations. Finally, the separate goal category of family orientation emerged, whereby students were motivated due to their gratitude for their schooling opportunity, their desire to repay their parents, and the family expectations that are placed upon them.

Students’ responses were similar to those of their teachers and parents, and all three groups viewed mastery, social, performance, and family goals as significant motivating factors for one’s effort and achievement in school. The next sections examine student, teacher, and parent comments surrounding the specific self-regulatory strategies that are employed by students to help improve their learning.

**Self-Regulation**

The final variable that was examined in the previous two chapters, self-regulation, also emerged from the current data as playing an important role in students’ learning experiences at school. Students, teachers, and parents discussed the self-regulatory strategies that students employ in the classroom that assist them in their learning. The following sections outline the frequencies of
student, teacher, and parent responses to the self-regulation categories, and example data highlighting the themes and responses are presented.

**Self-Regulation Frequencies**

Five of the initial six self-regulatory strategies examined in the previous chapters emerged in the current analyses. These were monitoring, regulating, rehearsal, elaboration, and planning learning strategies. The monitoring and regulating learning strategies were the most frequently reported strategies by students. In the quantitative analyses, these two categories of learning strategies merged to form a single factor and were combined into the single category of **clarification**. Thus, students did not seem to be distinguishing between these two types of strategies. In this section the two types of clarification goals will be discussed separately, but any clear relations between students’ mention of the monitoring and regulating strategies will be identified. Thus it will become evident why these two categories merged to form the single clarification category.

In addition to these strategies, students’ use of rehearsal, elaboration, and planning strategies also emerged from the data. Student, teacher, and parent descriptions of these themes will be presented. Furthermore, an additional two categories of learning strategies will be highlighted in the data that were not targeted in the previous two chapters. Firstly, students and teachers discussed the idea of participation as a strategy encouraged and used by students and teachers in class to enhance learning. Secondly, specific learning strategies for helping students overcome language difficulties were employed by students and
encouraged by teachers. The language difficulties especially experienced by students who are transitioning from *Tok Pisin* to English will be discussed and techniques adopted by students that were seen as being successful and helpful in this transition will be highlighted.

The frequencies with which students, teachers, and parents discussed these self-regulatory themes are presented in Table 8.6. These seven themes will be explored in more detail in the following sections.

Table 8.6. Self-Regulation Themes Emerging from Student, Teacher, and Parent Data

<table>
<thead>
<tr>
<th>Theme</th>
<th>Student Responses (n=32)</th>
<th>Teacher Responses (n=11)</th>
<th>Parent Responses (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>7 (21.88%)</td>
<td>-</td>
<td>1 (11.11%)</td>
</tr>
<tr>
<td>Regulating</td>
<td>21 (65.63%)</td>
<td>1 (9.10%)</td>
<td>7 (77.78%)</td>
</tr>
<tr>
<td>Rehearsal</td>
<td>2 (6.25%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elaboration</td>
<td>2 (6.25%)</td>
<td>3 (27.27%)</td>
<td>-</td>
</tr>
<tr>
<td>Participation</td>
<td>7 (21.88%)</td>
<td>4 (36.36%)</td>
<td>-</td>
</tr>
<tr>
<td>Planning</td>
<td>-</td>
<td>3 (27.27%)</td>
<td>-</td>
</tr>
<tr>
<td>Pidgin / English</td>
<td>7 (21.88%)</td>
<td>1 (9.10%)</td>
<td>-</td>
</tr>
</tbody>
</table>

Strategies
Self-Regulation Themes

Monitoring Learning Strategies

The use of monitoring learning strategies was reported by a number of students. Monitoring strategies involve checking one’s progress and level of understanding and seeking personal clarification to ensure that one is learning. These strategies involve alerting students to breakdowns in attention and comprehension and require students to intervene to prevent these breakdowns from having deleterious effects on their learning. Students mentioned on a number of occasions that they monitor their learning progress and understanding of school material by adopting these monitoring strategies. Some students said that when they were confronted with a problem in their work that they would spend time trying to work out how to fix it themselves. Other students said that they would often find alternative routes to work out how to solve problems. They reported that they would use examples from one problem to help them work out how to solve another problem and would transfer their skills across a range of topic areas. In addition to this, some students discussed the skills involved in learning from their mistakes and applying these lessons to future problems. For example, this student reflected:

\[
\text{You like challenge yourself and say ‘I can do this’ and then you, if you give the wrong answer, then you learn from it and you remember it. [SI43]}
\]

Students reported employing these strategies so that they could identify areas in their understanding that needed an intervention. For example, some students spoke of examining their current understanding of their
school or homework material, in order to identify areas where help was required.

As discussed in Chapter 3, this type of strategy is often considered to be a pre-requisite for the learning strategies of regulation. This type of strategy will be discussed in the following section, and links between the monitoring and regulating strategies will be drawn.

**Regulating Learning Strategies**

The most frequently mentioned self-regulatory strategy, and one highly related to monitoring strategies, was a *regulating* strategy. As outlined in Chapter 3, regulating strategies involve implementing particular intervening behaviours that help to counter difficulties identified from the monitoring process. Thus the two types of strategies are inherently linked. Consistent with this conceptualisation, students often spoke about regulating strategies in combination with monitoring strategies. For example, students would often say that regulating, by seeking help and information from other sources, was the step they would take after they had already applied monitoring strategies. For example, one student described her methods of attending to gaps in her knowledge by first obtaining extra information from the library, and second, by asking her teacher for assistance. This reported connection between the two strategies adds further support to the decision made in Chapter 6, to collapse the monitoring and regulating strategies into a single *clarification* category.

Students were asked to provide examples of how they would seek help and regulate their learning processes. Three main sources of help were reported.
The first was seeking help from the teacher. A large number of students said that this is an effective and helpful way to gain answers and explanations when they do not understand something. One village student said:

*When I don’t understand something in class, I pick up my books and I go to the office to see my teacher for more information, and her and I are gonna share. She’s gonna tell me what she knows or teaches me and we both share until I understand.* [SI30]

Teachers were consistently viewed as a solid source of knowledge and as someone who could be counted on to provide better explanations that assist in student learning.

The second source of help for regulation learning processes was from students’ parents. A selection of students said that they could approach their parents for assistance with homework they were struggling with and for further examples and clarification. One student from a remote village region commented on the language translation help that parents often provide their children:

*I’ll come and show my homework to my parents, they’ll explain it in our language, and I’ll understand the question in my book and I’ll do the work. They help me. Sometimes they give me an example… they’ll give me the advice, or how to do the homework, and do some examples, and I’ll see that and I’ll do it.* [SI6]

Other students, however, reported that their parents were not always capable of helping them with their educational problems. This theme of parent help will be discussed in greater detail in the coming sections.
The final source of assistance discussed by students was from their peers. A number of students expressed their desire to gain assistance from their peers and that this would often be their first choice over seeking helping from their teacher. This student described her overall help-seeking behaviour being a combination of monitoring and seeking help from peers and teachers:

*I try to get... I mean I try my best. Oh I ask my friends if they could explain it to me from their point of view and if I pick it up from them then I'm ok. But if I don’t get it then I go back to the teacher and ask the teacher to help me.* [SI43]

An interesting point here is the consistency of these peer help-seeking strategies with the social goals of sharing and displaying social concern for one’s peers. It seems that both the social motivational goals and the peer interaction regulating strategies are being endorsed by PNG students. The relations between these variables will be discussed in greater detail in the following chapters.

In summary, students consistently and regularly reported their application of these regulating and help seeking strategies within both their home and school educational environments. It is therefore interesting to note that it was this combined monitoring and regulating *clarification* strategy factor that was positively related to achievement and effort student outcomes in Chapter 7. This is a promising finding as these strategies were the most frequently espoused strategies and are also the strategies that are positively influencing student outcomes. Thus teachers should continue to encourage students in applying these learning strategies to their learning. The next section discusses students’ use of rehearsal learning strategies.
Rehearsal Learning Strategies

Students also reported the occasional use of rehearsal strategies in their learning. Students said that they used this strategy particularly when they are studying for an exam or a test. This student summarised the majority of student reports in regards to this strategy:

I memorise things first... reading my notes over and over and memorising things. I get to know things which will appear on the test. [SI45]

This strategy, however, was only mentioned in the context of studying for an exam. It was not used as a general strategy for classroom learning or completing homework. Mixed research results exist about the adoption of rehearsal learning strategies. On a number of occasions strategies such as rote learning and rehearsal have been shown to be negatively related to achievement. It appears though that in the case of PNG students, they are not utilising these strategies as regular classroom learning tools. Instead they are only adopting them for exam specific use.

Missing from the current analysis was an investigation of the influence of rehearsal strategies on student learning and achievement when applied in different learning contexts. The contrast of rehearsal use for exam performance with rehearsal use for general classroom learning and homework achievement should be examined further and this will be discussed in the following chapter. The following section describes students’ use of elaboration learning strategies.
**Elaboration Learning Strategies**

Some students discussed elaboration strategies as a tool for expanding their knowledge of specific content area they are trying to learn, and as a technique for understanding how different concepts fit together with each other. Students reported doing additional research and seeking information from sources such as textbooks, and visits to the library, as methods by which they elaborate their understanding of a topic. Some students described their use of analogies and creating examples as ways in which they improved their learning and understanding.

Teachers also highlighted students’ use of elaboration self-regulatory processes and reported their encouragement of these strategies in class. Teachers encouraged elaboration strategies because they expand students’ understanding of the material they are learning. This was demonstrated by this urban teacher:

*They would understand and they are able to relate that basic understanding to what they are reading, what they are doing and what they are supposed to do. I try to draw from something they know from the outside, some experience, and then I draw that in.*

TI17

In their attempt to encourage students to see how information they already know fits together with information they are learning at school (i.e., by encouraging elaboration) teachers reported that they often use familiar materials as examples in their methods of teaching. Teachers gave a number of examples of the positive benefits of using local and familiar teaching materials in the classroom setting. Typical of these reported benefits, this village teacher said:
They can identify with the stuff that you’re using… leaves and whatever. I think that they can identify with that. You introduce a block that maybe they have never seen before, their interest in maths is not there. They’re looking at this new thing, so you’ve lost their concentration altogether, before you’ve started the lesson. [TI10]

Teachers suggested that the use of familiar materials helped to bridge the gap between those concepts that students already had an understanding of, and concepts that were next in line to learn.

These data show that elaboration strategies were encouraged by classroom teachers and were reported by students as being beneficial to their learning processes. The following section outlines the final strategy, planning, that was examined in the quantitative analyses.

**Planning Learning Strategies**

Teachers were the only group to highlight the importance of planning self-regulatory strategies. Planning strategies involve defining learning goals and setting specific action goals and agendas for goal attainment Teachers spoke of their attempts to engage students in and to model these planning activities. Teachers mentioned planning structured lessons, alerting students to expected outcomes, and encouraging student input into the organisation of their work structure. This teacher expressed some of these planning strategies:

*I make sure I present what the learning outcome should achieve at the end of the lesson, and the activities. I try to give activities*
and give them evidence that there are learning outcomes. [T149]

Teachers described these strategies as being helpful to their students’ learning because they allowed them to set personal goals and to measure their level of progression and achievement by their attainment of these goals. However, there was no mention of these planning strategies by the students themselves.

In summary, monitoring, regulating, rehearsal, elaboration, and planning strategies were all highlighted as learning strategies that were either adopted by students or encouraged by teachers in the classroom environment. These strategies were discussed as playing beneficial roles in student learning processes and were highlighted as increasing a student’s chance of performing well. The following final section discusses two additional learning strategies that were highlighted as playing important roles in student understanding and achievement outcomes.

Other Learning Strategies

The previous sections have discussed the monitoring, regulating, rehearsal, elaboration, and planning learning strategies that were investigated quantitatively in Chapter 7. Two additional themes, however, emerged from the interview data that were not investigated in the previous two chapters. These were the learning strategy themes of participation and language strategies.

Participation Learning Strategies. Students and teachers spoke about participation as both a cognitive learning strategy and a behavioural act. Students
reported participation as being a form of engagement and concentration in class, as well as being a behavioural strategy allowing them to speak openly in groups and to provide suggestions for problem solving and task completion. More frequently, however, students and teachers spoke about some of the barriers to participation and explored why some students choose not to participate in learning activities.

These reasons not to participate included shyness and lack of confidence, laziness and feeling comfortable with others doing the work, and feeling inferior to those students who ‘appear’ more intelligent than themselves. Teachers and students, however, also recognised the advantages of participation and spoke of some ways in which they encourage this. Teachers described methods of singling out students and placing some students in leadership roles in groups as a way of encouraging their participation. Students spoke about developing courage and confidence to participate behaviourally more in class and to engage in social concern and helping activities (discussed earlier) that will encourage their peers to participate more.

Overall, strategies aimed towards increasing student participation in class, were viewed as being beneficial to one’s overall learning experience. Directions for future quantitative and qualitative research will be presented in the following chapter on this theme, and should examine these strategies in further detail and explore the relations between them and other learning strategies and student outcomes. The following section describes the second additional learning strategy that emerged from the data – strategies involved in overcoming language difficulties.
Language Learning Strategies. The final learning strategy that emerged from the interview data was one that was used by students who were experiencing specific language difficulties. As outlined in Chapter 2, English is the official language of PNG, whilst the two languages of Tok Pisin (Pidgin) and Motu are the two national languages. English is the official language used in education and government. In addition to these three languages, there are over eight-hundred languages that spread throughout the country – the largest and most diverse selection of languages found in any country in the world. Under the current education system, students are taught in their vernacular (local) language in elementary school. When they begin primary school (Grade 3), however, they are taught in English. In many cases, especially where English is not spoken in students’ home villages, this causes a very difficult transition period for the child as they are expected to speak, understand, and be taught in English. Tok Pisin and Motu are spoken more frequently in home communities than is English, so the result in this transition period is often that students will resort to using one of these languages as a translation medium. It is also often the case that teachers do not speak students’ vernacular languages but that they do speak English, Tok Pisin, and Motu. When students are more familiar with Tok Pisin and Motu than they are with English, teachers too will use these languages as a translation tool.

There are a number of issues, however, that arise from this and some schools across PNG are beginning to address these problems by banning the use of Tok Pisin in school. The main problem stems from the fact that Tok Pisin is a ‘Pidgin’ language, stemming partially from English, and there are many similarities across the two languages for some words. One of the main problems
that teachers, students, and parents identified with this was that for some words, although the English and Pidgin versions were pronounced identically, they are spelt differently. This teacher articulated the problem as seen by a number of teachers interviewed:

The children who speak Pidgin at home are the most difficult to teach when they’re teaching them in English. I think they’re already confused. I mean, they found difficulties in English because they already spoke Pidgin at home, and they found it rather confusing. [TI10]

She went on to provide the following example of these difficulties:

An example would be the word ‘house’. If you asked a child who knew how to speak English and spell in Pidgin the word ‘house’ he would spell the word ‘h-o-u-s-e’. You ask him to spell the word ‘house’ later on and he’ll spell ‘h-a-u-s’ [correct Pidgin spelling]. He’s not wrong, but it is wrong in English. It is hard to teach a child English if he’s already learnt Pidgin. [TI10]

This teacher emphasised the importance of not using Tok Pisin in the school setting and the rules at her school reflected the rules across a number of schools in PNG. However, not all teachers agreed with this decision. Some teachers, especially those who were teaching in remote villages and who were not originally from these villages (and therefore do not speak in the local vernacular), advocated the use of Tok Pisin as a translation tool. One example of this was given by the following remote village school teacher:
The kids hardly understand, because they come from different backgrounds. Those in town and urban areas, they can speak English as early as 3, 4, 5, 6 years and that’s ok with them. But those kids out in the remote villages like [name of village] here, they’ve been used to the Tok Ples [local vernacular]. To get into English is a process and it will take time. So that’s a reason why we, from time to time, use Tok Ples. If for my case, I can’t speak Tok Ples because I’m not from here, so I try my best to get some concepts into Pidgin [Tok Pisin] because they do speak Pidgin.

[TI24]

However, these teachers, although they advocated the use of Pidgin in their teaching styles, still recognised some of the problems that Pidgin caused for the learning of English. The above village teacher clarified this idea:

_it [Pidgin] does cause some problems for those who are Pidgin speakers who grew up speaking Pidgin all the time and then when they tried to speak English, or when they’re asked to speak English, there are some words, which when spoken are similar, but actually writing them is different. Speaking, you can’t identify them. You only identify these sort of problems in written work._ [TI24]

Students also spoke about the many difficulties associated with the alternative use of Tok Pisin, Tok Ples, and English in school. Many students explained their desire for their teachers to use Tok Pisin as a bridge between their vernacular language and English. However, the majority of students also
recognised the many problems associated with the use of Tok Pisin in school, especially those pertaining to spelling and written work. One student gave another example of a word where the oral pronunciation of the word in English and Pidgin is identical but the written versions are different. The English word ‘come’ and the Pidgin word ‘kam’ have the same meaning, are pronounced in the same way, but are spelt differently. Specific grammatical differences were not directly mentioned by the students.

Students, when asked how they overcome these difficulties, spoke of learning strategies that they employed, specifically for this language problem. A number of students reported that they read a lot of books written in English to expand their exposure to the English language, particularly written English. This behaviour was described by the following rural student:

*To make it easier for me is to read a lot of books. Not bad books, but good books to enlarge your knowledge and to cut down on the speak of the Tok Ples and Tok Pisin [SI46]*

This language specific version of the elaboration self-regulatory strategy helped students to recognise errors they were making in their current work, to expand their vocabulary, and to improve their spelling ability. Students also discussed their use of regulating learning strategies in assisting with these language problems and reported on a number of occasions seeking help and clarification from their teacher and parents. Furthermore, the usefulness of these language-specific learning strategies, were also emphasised by students’ parents, who believed that interventions were necessary in order to ease some of the difficulties created by the linguistic diversity in PNG.
Summary

This section has discussed the self-regulatory learning strategies utilised by students in PNG classrooms to aid their learning. The most frequently mentioned strategy was a regulating strategy where students sought help from other sources to solve problems identified by monitoring strategies. Monitoring, elaboration, rehearsal, and planning strategies were also discussed in light of student, teacher, and parent data, and optimal learning conditions were identified. Finally, the two additional themes of participation and language specific strategies that emerged from the interview data were discussed.

The following and final section examines further themes that emerged from the student, teacher, and parent data in regards to specific teacher and parent characteristics that influence student learning and experiences at school.

Additional Themes Emerging from Qualitative Data

Two additional themes emerged from the qualitative data that were not directly targeted by the quantitative questionnaire. These were the specific characteristics of teachers and parents that also played important roles in influencing student achievement, effort, and experiences at school. For the teacher theme, six main categories of positive teacher characteristics emerged from student interviews: (a) aid understanding; (b) explain with examples; (c) monitor student progress; (d) are warm and friendly; (e) are patient and understanding; and (f) are approachable to ask questions. The first three categories describe teaching style whilst the latter three categories describe positive personality characteristics.
For the parent theme, there were two main categories and six subcategories of parental influence. Students reported that parents provided assistance in either direct or indirect ways. They gave three examples of direct pathways of help. These were in translation, giving examples, and aiding understanding through giving advice. The three examples of indirect help were by giving encouragement, talking about the future, and providing students with practical belongings. The frequencies with which students mentioned the major teacher and parent themes are displayed in Table 8.7 and the themes will be discussed in more detail in the following sections.

Table 8.7. Teacher and Parent Characteristic Themes Emerging from Student Data

<table>
<thead>
<tr>
<th>Theme</th>
<th>Category</th>
<th>Student Responses (n=32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>Aid Understanding</td>
<td>9 (28.13%)</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Explain with Examples</td>
<td>20 (62.50%)</td>
</tr>
<tr>
<td></td>
<td>Monitor Student Progress</td>
<td>7 (21.88%)</td>
</tr>
<tr>
<td></td>
<td>Warm and Friendly</td>
<td>14 (43.75%)</td>
</tr>
<tr>
<td></td>
<td>Patient and Understanding</td>
<td>11 (34.38%)</td>
</tr>
<tr>
<td></td>
<td>Approachable to Ask Questions</td>
<td>3 (9.38%)</td>
</tr>
<tr>
<td>Parent</td>
<td>Direct Pathways</td>
<td>11 (34.38%)</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Indirect Pathways</td>
<td>23 (71.88%)</td>
</tr>
</tbody>
</table>
**Teacher Characteristics**

In the interviews, students were asked the question ‘what do you think makes a good teacher?’ The majority of student responses to this question were positive and six main themes emerged pertaining to what students thought comprised a good teacher. The first of these was the role teachers play in aiding a student’s understanding of a topic area. Students who discussed these qualities said that what characterises a good teacher is their ability to increase student understanding of the subjects they are being taught and their ability to make learning relevant and interesting. This remote village student represented other students’ thoughts on this theme:

*She gives* clear, understanding to the students, and *is an open* teacher. *She doesn’t keep to herself, she keeps on talking to make us understand* [SI12]

Similar to the concept of increasing student understanding is the second quality that students valued in their teachers. This was when teachers used examples to explain unknown concepts. When asked to describe one of her good teachers, this urban student reflected the sentiment of the majority of other students:

*They are clear teachers. They explain in a way that we understand, not too, you know… they explain in a way that all the students understand.* [SI15]

Other students spoke about their teachers using specific examples and practical and familiar materials to assist in their learning. These examples provided students with an alternative explanation for concepts that were otherwise unclear
and difficult to grasp. Some students also described the helpfulness of their teacher’s use of analogies when teaching difficult content areas. Teachers would use analogies, examples, and other forms of elaboration strategies to provide alternative explanations for concepts that their students were struggling with. Interestingly, many of these teacher-specific strategies that were highlighted as being helpful to one’s learning, are consistent with the elaboration and clarification strategies that were discussed earlier and examined in the previous two chapters. Teachers seem to be both utilising and encouraging students’ use of these learning strategies as effective tools of communication, learning, and achieving academic outcomes.

The third quality that students spoke of that characterised a good teacher was when their teachers carefully monitored their progress in class. Students said that they appreciated teachers who came around during class and asked each student individually if they were coping ‘fine’ with their work. Students also spoke highly of teachers who (the students thought) intuitively knew which students were struggling and would go out of their way to assist them. Some students mentioned that their teachers would look at them and know when they were struggling and proceed to intervene with advice and help. These monitoring qualities were all regarded as positive and beneficial to student learning.

Next, students described three positive teacher characteristics which revolved around teacher’s personality and character traits. Firstly students spoke of ‘good teachers’ as being warm and friendly to them. Many students described their social interactions with the teachers, both in and out of the classroom, and
praised teachers who were friendly. This student expressed the students’ reasons for wanting a teacher who is friendly:

*Well they’re more fun to learn with. They make the environment more free. You feel comfortable with them, and if you don’t understand, they explain again so you will understand* [SI15]

Secondly, students thought that teachers who were patient and understanding of their needs were also ‘better’ teachers. Students suggested that this patience would result in a teacher listening more to his or her students as well as developing a greater understanding of their abilities, personalities, and motivation for learning. They suggested that when good teachers care about students and listen to their ideas and opinions, this makes them more likely to want to answer questions and provide guidance for students.

Finally, students emphasised that teachers who were approachable when students had questions were better teachers and helped them learn more effectively. Describing these qualities, one student said that his teacher was always open and approachable when he had a question and that his teacher would attempt to provide an answer on ‘the level’ of the student so that he could understand.

In addition to students’ mention of these six teacher characteristics being useful to their learning, many of these categories were discussed by the teachers themselves as being beneficial to student learning. Teachers reported use of these teaching strategies when they were discussing students’ adoption of particular learning strategies as discussed in previous sections. For example, when teachers discussed students’ regulation learning strategies, such as student help-seeking
behaviour, they also emphasised the need for them to be approachable, engaging, and friendly in their interaction with their students. In addition to this, some teachers spoke of modelling certain strategies in their teaching that students could imitate and apply to their own learning, such as planning lessons, drawing up agendas, and monitoring their progress. Thus, the characteristics and teaching strategies that students viewed in their teachers, were often transferable to students’ own learning processes and had positive impacts on their academic outcomes.

All of the qualities discussed above emerged from the data collected across a range of students and teachers and across the range of village, rural, and urban regions. The next section discusses the themes that emerged about positive parent characteristics and how they influence student learning.

**Parent Characteristics**

Students described two different pathways that their parents often took when they were providing their children with help. These were direct and indirect pathways. The direct forms of help given to students by their parents were of three main types. The first type was the help parents gave students in language translation. Students, particularly the younger students from village and rural regions, often reported the difficulties they experienced in understanding instructions and homework that were given to them in English. Some students said that their parents would help them by translating this information into either *Tok Pisin* or *Tok Ples*. This young village man summarised some of the village students’ experiences:
I’ll speak in the language… I’ll read what is on the book. Then they’ll [parents] explain it in our mother’s language [vernacular/Tok Ples] and then I’ll know. I’ll get an idea from what they’re saying and then I’ll do it my way. [SI5]

The second type of direct help that parents gave their children was to provide them with examples to aid their understanding of a topic. As with teachers, parents were reported as providing practical and familiar examples and metaphors for students struggling to grasp a certain concept. By making concepts and topics relevant, students said that the examples their parents provided them would increase their level of understanding and learning.

The final type of direct help was topic advice and direct intervention. Many students said that when they did not know how to complete an exercise in their homework, they would ask their parents for help. Their parents could then directly intervene and demonstrate for their child how to complete the exercise.

This student reflected this thought:

They help me with maths when I’m not doing well. I come home and they go through it. I’ll give them the work and they’ll go through the books and see if I’m not right and they correct me with their maths. [SI30]

Some students, however, discussed the low ability levels of their parents. These students said that they were not able to go to their parents for direct help with schoolwork because their parents do not know how to complete the tasks. Many parents also echoed these same sentiments and reported often ‘becoming stuck’ with their children’s homework exercises and not being able to provide
them with direct assistance. Many people in PNG have not had the opportunity
to gain even a basic primary level of education and so providing their children
with direct help can sometimes be difficult. It is not surprising therefore to note
that the percentage of parents who provided their children with direct help was
substantially lower than the percentage of parents who provided their children
with indirect forms of help (see Table 8.7).

These indirect forms of help do not require a minimal level of education
as a pre-requisite. According to the themes emerging from the student data, they
include three main categories. The first way parents were reported as providing
indirect help to their children was in providing them with encouragement.
Students often highlighted that their parents would encourage them in their
studies and in their educational careers. Some students discussed different ways
in which their parents provided this encouragement:

*They encourage me to do my best in school, and they tell me and
encourage me not to stay around with bad peers.* [SI34]

Encouragement predominantly took the form of emotional
support for students’ schooling efforts. For example, parents would use
phrases such as ‘you are doing very well’ and ‘keep up the hard work’ as
forms of emotional encouragement. Students emphasised the positive
side effects of these forms of encouragement as feeling better about
themselves and the comforting knowledge that they had full access to
parental support.

Secondly, students said that parents provided indirect help in the form of
guidance and advice for their futures. A number of students noted that their
parents would talk to them about the future and the importance of gaining an education to achieve their future goals. Parents discussed study and career opportunities with their children and provided advice for achieving such ambitions. This student spoke of his father’s delivery of future advice and encouragement:

*My Dad thinks it’s [school] important. He says the only two things that we cannot negotiate is eating and going to school. Because my Dad always says, ‘you go to school, and when you get married you can provide and protect for your family’. He also uses some of my Uncles back at the village as an example. ‘Like you see they have no jobs and they are really struggling right now’. So that’s why he encourages us to come back to school.*

[SI16]

The final form of indirect advice that parents reportedly gave their children was in the form of practical assistance. When asked ‘how else do you parents help you?’ a number of students discussed their parent’s financial and practical support. Students said that parents would pay for their school fees and boarding fees (when applicable). They would buy their school uniforms and stationery for school. Some students also explained the help provided simply by their parents’ provision of basic requirements such as food, water, and clothing. Other students described practical help in the form of providing them with a quiet place to study and concentrate. These were all seen as being beneficial to their learning and as contributing to their educational achievement.
In summary, students identified a number of ways that they perceived their teachers and parents as being helpful to their educational experiences. These two additional types of influences on student achievement were not measured quantitatively in Chapters 6 and 7 and future research both benefit from including such influences into a model of student achievement and examining the relations between them and student outcomes. The majority of students discussed the positive characteristics they perceived in their teachers and parents and stated that they consistently assisted them in their understanding and learning. Thus it is vital to examine these broader social and family related characteristics, in addition to internal student characteristics, when investigating student learning and achievement in the future.

Summary

The current chapter qualitatively examined the influences of four psychological variables on student achievement – future goal orientation, perceived instrumental value, motivation, and self-regulation. It also elucidated a number of additional themes that were not specifically targeted in the quantitative analyses, for example, English – Pidgin language transition learning styles and teacher and parent characteristics. Student, teacher, and parent data extrapolated from semi-structured interviews and open ended responses were provided to highlight and present the stories underlying the emerging themes. Where possible, triangulation was used to enhance understanding of the emerging themes, by linking responses given by the different groups. Teacher and parent responses were combined with student responses across different
regions and socioeconomic status levels in PNG to provide a more complete understanding of the influences of students’ learning experiences. Furthermore, where possible the qualitative data was triangulated with the findings elicited in the quantitative analyses in order to provide an understanding of the results reported in the previous two chapters. Major findings resulting from these quantitative and qualitative studies will be highlighted and discussed in the following chapters.
CHAPTER NINE

DISCUSSION AND IMPLICATIONS FOR FURTHER RESEARCH AND PRACTICE IN PNG

Introduction

The previous three chapters have outlined the results of the quantitative and qualitative studies comprising the current investigation. Study 1 aimed to examine the psychometric properties and structural invariance of the quantitative instrumentation, and to highlight group differences in future goals, perceived instrumentality, motivation, self-concept, and self-regulation across gender, grade, and region. Study 2 aimed to examine the relations between each of these psychological variables, socio-economic influences, and students’ academic outcomes. Finally, the purpose of Study 3 was to illuminate and extend the findings of the quantitative studies with student, teacher, and parent qualitative data. The aims of the current chapter are to: discuss the purposes and key findings of these three studies in relation to theory and research; present the strengths and limitations of the research design of the current investigation; and elucidate the implications of the study’s findings for theory, research, and educational practice in PNG.

Discussion of Study 1 Key Findings

There were two main aims of the first study. The first aim was to examine the validity, reliability, and invariance of all instrumentation for use in a new cross-cultural setting. The second main purpose was to investigate similarities
and differences in students’ future goals, instrumentality, motivation, self-concept, and self-regulation scores across gender, grade, and region. The findings are discussed in the following sections.

**Psychometric Properties**

The first purpose of Study 1 was to examine the psychometric properties and structural invariance of the instrumentation measuring the five psychological variables within McInerney’s (2007) revised model of student achievement. Confirmatory factor analyses (CFAs), reliability analyses, and invariance testing, were initially performed on: the Future Goals Questionnaire-PNG; the Inventory of School Motivation, the Self Description Questionnaire II-Short, and the Goal Orientation and Learning Strategies Survey.

With some minor adjustments, the FGQ-PNG, ISM, and SDQII-S were found to be valid and reliable measures of the psychological constructs they were designed to measure. The GOALS-S required more significant adjustment. One of the cognitive scales did not demonstrate strong psychometric properties for the PNG sample and was therefore removed from the analysis. In addition to this, the two meta-cognitive scales, the monitoring and regulating scales, were not found to be distinct latent constructs for the PNG sample. Therefore, these two scales were collapsed to form a single clarification scale. Support for this was found in three main areas. First, the statistical results of the GOALS-S CFA indicated that these two scales were highly correlated and therefore students were not distinguishing between them. Second, upon examination of the theory behind these scales, it was found that they are indeed inherently related. It seems that
monitoring and regulating processes actually form two stages of an overall clarification and problem solving learning strategy. Monitoring involves examining one’s learning progress and identifying lapses and difficulties in understanding and achievement. Regulating then involves attending to the problems identified by the monitoring strategies, and implementing an intervention, such as seeking help or clarification, to solve the problem. Finally, the qualitative analyses added further support for this decision to combine the two scales into a single clarification scale. When students reported the uptake of monitoring strategies they often simultaneously reported implementing regulating strategies to assist with any learning difficulties. As outlined in Chapter 8, students consistently spoke of monitoring problems they were experiencing in the classroom and intervening with strategies such as help-seeking and clarification. These results therefore suggest that appropriate steps were taken in collapsing the monitoring and regulating scales into a single clarification factor.

The newly derived four-factor structure of self-regulation, along with the models of future goal orientation, perceived instrumental value, motivation, and self-concept, was then tested for structural invariance across gender, grade, and region groups in PNG. The factor structure for each of the psychological variables was found to be invariant across grade, gender, and region, at least according to the minimum requirement of invariant factor loadings. These findings were pertinent to the remaining studies of the investigation and to future quantitative research in PNG and other Indigenous, developing, and majority cultures. These results suggest that male and female, primary and secondary, and
urban, rural, and village students from the PNG sample are all interpreting the structure of future goals, instrumentality, motivation, self-concept, and self-regulation in similar ways. Furthermore, for the scales in which no adjustments were made to the factor structure, the psychometric findings suggest that these PNG students are interpreting those variables in a similar manner to students in other cultures where the instruments have already been utilised and validated. For example, since the original factor structure of the ISM was valid, reliable, and invariant across groups in PNG, it is reasonable to conclude that cross-cultural comparisons could be made between PNG student motivational profiles and the profiles of those students from Australia, America, Hong Kong, Africa, and others, where the ISM has been previously validated (McInerney et al., 1997; McInerney & Ali, 2006).

In summary, the results of the CFAs, reliability analyses, and invariance testing suggest that the five psychological constructs within McInerney’s revised model of student achievement are transferable across cultures, and that the instrumentation that was used to measure them are applicable for use in the diverse cross-cultural setting of PNG. These findings have implications for the future use of the FGQ-PNG, ISM, SDQII-S, and GOALS-S within PNG and other cross-cultural settings.

**Similarities and Differences across Groups in PNG**

The second purpose of Study 1 was to examine similarities and differences in students’ profiles on the five psychological variables across gender, grade, and region. To do this, Multiple-Indicator-Multiple-Indicator-
Cause (MIMIC) models were performed examining the main effects of gender, grade, and the gender by grade interaction for each of the psychological variables across the three different regions in PNG.

There was general consistency in gender and grade differences in students’ endorsement of the psychological variables across the regions. Where patterns were not consistent across the regions, it was arguably due to limited sample size in some of the groups, and hence suppressed statistical power. Upon examining gender differences, females were significantly higher than males in their endorsement of affiliation, concern, and overall social motivational goal orientations, success future goals, and English self-concept. On the other hand, males endorsed social power, token, and overall performance motivational goal orientations, authority future goals, success instrumental value, and mathematics self-concept variables significantly more than females. The finding that males are more performance oriented than females is consistent with past literature across various cultures (Giota, 2002; Meece & Holt, 1993; Ve, 1991). Particularly, for these PNG students, it seems that males are more likely than females to be motivated by roles of leadership and authority in school settings, and from receiving extrinsic, token rewards. Conversely, females were more likely to be motivated than males by being in social and peer affiliation environments at school, and by helping and assisting their friends with their work. Also consistent with past research is the finding that females have higher English self-concepts whilst males have higher mathematics self-concepts. Studies by Watt (2004), Crain (1996), and Marsh (1989, 1993) have consistently found self-concept gender differences favouring males for mathematics self-concept and females for
English or verbal self-concept. Furthermore, these studies have found that these trends are consistent across a student’s age or grade level. The fact that the current study did not find any significant gender by grade interactions effects for either type of self-concept supports this finding. That is, the differences between these PNG male and female mathematics and English self-concepts did not vary a function of grade.

Although success and authority future goals have not been specifically targeted before, the current study yielded interesting findings with regard to gender differences in future goal orientations. Females were found to adopt success related future goals, such as graduating from high school, getting into university, and gaining employment more than males did. Conversely, males adopted authority-related future goals concerned with gaining positions of status and authority, to a greater extent than females. These findings are also related to students’ motivational profiles in which males were more performance oriented than females. Perhaps male students, who desire to attain goals of reaching a certain status or authority position in the future, will be motivated by immediate goals involving leadership, status, and social power. It is necessary, however, to consider these results in the context of the relations between these types of future goals and student learning and achievement outcomes. These comparisons will be examined later.

In addition to gender main effects, there were also a number of significant grade main effects. As students’ grade levels increased, so did their levels of task, effort, and overall mastery goal orientations, their social concern and overall social orientations, their success future goals and success perceived
instrumental value, and their clarification learning strategies. These findings suggest that some of those psychological variables that are traditionally considered to be positive influences of student learning outcomes are increasing amongst PNG students as they get older. Furthermore, as students’ grade levels increased, their endorsement of social power motivating goals, authority instrumental value, and English self-concept, significantly decreased. Given the diverse linguistic nature of PNG, the result concerning English self-concept is a pertinent finding for students’ educational experiences. As outlined in previous chapters, English is the official language of instruction within a country defined by more than eight hundred distinct languages, and even more dialects (see Chapter 2). It is therefore an interesting finding that as students progress through their schooling grades, their self-concept of their English language ability decreases. Perhaps the combination of the increasing complexity of the English schooling subjects with the difficulties of learning English as second, third, or fourth languages, and an increased understanding of the diversity of PNG languages, is resulting in students’ decreased levels of English self-concept. This suggestion requires elucidation by future research.

In addition to the gender and grade main effects, three significant gender by grade interactions were found. These interactions were found for students’ immediate social concern goal orientations and their perceived value of school in helping them to achieve success and authority related future goals. Although social concern scores increased over grade levels, and females in general endorsed them to a greater degree than males, this gap reduces significantly in Grade 11, and the gender pattern actually reverses in Grade 12. It seems
therefore that this difference between males and females in social concern habits is significant during primary school, but is less pronounced in high school. Males seem to be developing these motivating goals at a later stage than females, but nevertheless, they do develop them eventually.

A similar pattern seemed to be occurring for students’ authority instrumentality scores. Unlike social concern goals, students’ authority instrumentality scores decreased over grade. However, in a similar way to the concern patterns, the gap between males and females decreased during this time. During primary school, males reported higher authority scores than females, yet this gap closed as students progressed through high school. Thus both males and females in the current study reported that they value school less and less during their senior years in helping them to achieve any authority goals they may set for themselves.

A different pattern occurred for success perceived instrumental value. Whilst the gap between males and females was minimal during primary school, it increased over time, and in Grade 10 males displayed a significant increase in the value they said they placed on school in helping them to reach success goals such as entering university and gaining employment. It is understandable that such a peak for this success construct would occur during Grade 10, since this grade marks a significant transition period from junior high to senior high school and entry for students is competitive, difficult, and depends on increased effort and performance. What is not clear, however, is why there is such a significant difference between males and females at this stage. Something is occurring during Grade 10 that is resulting in male students reporting a greater value of
school than females because of the role they perceive it serves in helping them reach success goals. This finding requires further exploration.

In summary, this section has discussed the study’s findings concerning gender and grade differences on the psychological constructs and gender by grade interactions for social concern goals and authority future goals and perceived instrumental value. The following section discusses the results obtained in Study 2 of the present investigation.

**Discussion of Study 2 Key Findings**

The aims of Study 2 were to examine the relations between the five psychological variables in McInerney’s revised model, students’ socio-economic status, parent education levels, and achievement and effort outcomes, and to identify the most important influences of student academic outcomes. Initially, the relations between the variables were examined separately for each psychological variable, and the path patterns were examined across gender, grade, and region. The majority of the moderating analyses found there to be little overall differences across gender, grade, and region groups. However, some of the individual paths appeared to be significant for some groups but not for others and are discussed below.

**Future Goal Orientation and Perceived Instrumental Value**

Analyses conducted on the overall sample highlighted four significant future goal paths. Authority future goals were significant negative predictors of both English and mathematics achievement, whilst village future goals were
positive predictors of English achievement and mathematics effort scores. Furthermore, authority instrumentality negatively predicted both types of achievement as well as students’ levels of effort applied to their mathematics work. Conversely, village instrumental value positively influenced mathematics achievement and effort only.

It seems that to the extent that students achieve at school, they do not endorse status aspirations, nor place value upon school in contributing towards the achievement of such positions of status and authority. The findings pertaining to the negative influence of authority goals on English achievement was consistent across grade and gender. However, the other negative effects of authority goals and instrumentality tended to mainly occur for males and younger students. These findings are important when considering the implications of the findings in Study 1. Males endorsed authority goals to a greater extent than females, and overall, as students’ grade levels increased, their authority instrumentality scores decreased. The negative effects of authority goals and instrumentality are particularly evident for males and since males are the stronger endorsers of these goals, these results therefore suggest that perhaps males may benefit from interventions aimed at reducing authority-related goals.

Furthermore, authority instrumentality had negative influences on achievement particularly at the primary level, but this negative path did not apply to the secondary sample. Therefore, since this type of instrumentality decreases as students age, it is possible that intervention may only be necessary for male students in primary school.
Significant interactions were also found for students’ future goals and the value they placed on school towards achieving those goals. Thus for authority goals, the negative influence of the goals on student outcomes is only occurring when students believe that school can contribute towards the achievement of such status and power positions. Therefore, it could be argued that intervening simply at the level of instrumentality may ultimately reduce the negative influence of holding the authority goals themselves. This is a more practical solution. That is, interventions designed to encourage students to change their views of school towards being valuable for success goals (such as getting into university and getting a job or helping their village) rather than authority-related goals, are more likely to be effective than interventions preventing students from actually adopting the authority goals in the first place.

Neither students’ success future goals, nor their success instrumental value scores were found to be significant predictors of outcomes in the SEMs. A significant interaction, however, was found between success goals and instrumentality and the result was a positive influence on student outcomes. That is, when students hold success goals, such as getting into university, it is only when they simultaneously believe that school is valuable in helping them achieve these goals that the result will be a positive influence on effort and achievement. This finding is consistent with the interaction effect posited by Lens (1986) and Nuttin and Lens (1985). Furthermore, in the previous section it was reported that females endorsed success future goals more than males, males endorsed success instrumental value more than females, and that both success goals and instrumentality increased over time. This finding whereby both success goals and
success instrumentality increase simultaneously with age is promising because of the positive relation with achievement outcomes that the combination of these two variables share.

According to these results, both success and village future goal orientations, and the perceived value students place on their current school activities for helping them achieve these types of goals, might be considered a useful area for intervention. It seems that the simultaneous encouragement of goals and instrumentality is especially pertinent for success-related goals since the interaction results suggested that it was only when students were high on both factors that there were positive outcomes on achievement. For the village-related goals, however, both the village goals and the village instrumentality independently had positive influences on student outcomes.

In addition to these findings, Study 2 found that authority goals and instrumentality had a negative effect on student outcomes, and so students’ endorsement of these goals and instrumentality should be discouraged in the PNG student sample. In particular, due to the combined negative influence of the goals and instrumentality levels, an intervention directed primarily at the value students place on school in achieving authority goals, might well be effective in reducing the negative influence the goals can have on student outcomes. Future research could explore these suggestions further in other areas of PNG to determine the cross-cultural generalisability of the results.
Motivational Goal Orientation

The next psychological variable that was examined within the framework of McInerney’s revised model of student achievement was motivational goal orientation. SEM analyses examined the relations between both the first-order and higher-order models of motivation and student outcome measures. Consistent with past research were the findings that mastery goal orientations were positively related to student outcomes, whilst performance goal orientations were negatively related to them (Covington, 2000). Higher-order social goals did not have any significant relations with effort or achievement outcomes. However, examining the higher-order model does not always give a complete understanding of the underlying processes of motivation. Therefore, a first-order SEM was performed, examining the relations between all eight first-order motivational goals and student outcomes. The results of these models showed that the positive influence of mastery-related goals on academic achievement were accounted for mainly by task goal orientations, whilst the negative influence of performance goals on achievement and effort could be attributed to social power goals and praise goals. Thus, the results imply it may be useful to place emphasis on task goals and encouraging students to adopt orientations concerned with interest, valuing tasks, enjoying academic activities, and challenging one’s knowledge and learning levels. Furthermore, emphasis should be taken away from performance goals concerned with holding positions of social power and receiving praise. However, this is not to say that teaching techniques such as offering praise and positive comments should be eliminated from the PNG classroom. Praise has previously been shown to often impact
positively on student learning outcomes in other educational settings. Rather, it seems that students who specifically adopt goals only concerned with gaining positions of power and receiving praise and external feedback only, are demonstrating negative achievement and effort outcomes. Thus, such performance-oriented students should be encouraged to adopt alternative goals that do not have a motivational focus on power and praise. Further research should also investigate the combined influence of adopting such performance goals with more adaptive motivational orientations to elucidate the combined effect on student outcomes. Further research could also examine different types of feedback techniques, such as informational praise and constructive criticism, and the influence these variables have upon student outcomes.

Past research has suggested that certain types of performance goals encourage the use of surface level learning strategies, self-handicapping techniques, and academic cheating behaviours, which ultimately lead to lower effort and achievement levels (Anderman et al., 1998; Elliot & Church, 1997; Elliot & McGregor, 2001; Urdan et al., 1998). Self-handicapping and cheating behaviours were not directly targeted in the current study so it is unclear whether or not these PNG students’ performance goals are influencing these types of behaviours which are detrimental to student outcomes. This requires further investigation. However, learning strategies were included in McInerney’s overall model of student achievement and the relations between performance goals, self-concept, self-regulation, and outcomes were examined. Whilst mastery goals were found to be positively related to all four types of learning strategies, performance goals were only related (positively) to rehearsal and planning
strategies. Rehearsal learning strategies have often been found in the past to be negatively related to student learning outcomes. Certain rehearsal strategies have been viewed as superficial learning processes that encourage disorganisation, disengagement, and ultimately lower levels of effort and achievement (Elliot et al., 1999). Thus, although mastery goals were also positively related to rehearsal strategies, perhaps the negative influence of adopting these strategies is counterbalanced by the positive influence of either the elaboration or clarification strategies which are not being adopted by performance oriented students.

Alternatively, perhaps mastery goals and rehearsal strategies in combination, may work effectively, in counteracting the negative effects of rehearsal strategies when used alone on material that is not well understood.

In addition to the first-order mastery and performance goals, the two first-order social goals were also examined in relation to student outcomes. Although the higher-order social factor did not predict student outcomes, investigation of the first-order model found this could be attributed to the opposing influences of the two types of social goals. The results of this first-order model showed that whilst social affiliation goals were negatively related to student achievement, social concern goals were positively related to student achievement. Thus, to the extent students do well in mathematics and English achievement, they do not endorse social motivational goals such as affiliating and interacting with one’s peers and developing friendships, networks, and social circles. Alternatively, motivating goals which endorse social helping and concern behaviours, such as teaching new material to a friend or assisting one’s peers with classroom activities, were found to be positively related to PNG students’ achievement
outcomes. These findings are also consistent with past research by Wentzel (1991) who found that affiliation goals were negatively related to academic outcomes whilst social responsibility goals were positively related to them. Wentzel suggested that affiliation goals can have detrimental effects due to the social distraction from one’s academic tasks created by affiliation and peer interactions. However, when the focus remains on learning and mastering a task, as is the case for social concern goals, the result on student outcomes is positive.

A further interesting finding from the gender analyses was that the positive influence of social concern goals on achievement, and the negative influence of affiliation goals on English achievement, was only apparent for the female PNG students. This finding is also interesting given the results of Study 1 which found that females endorsed both types of social goals to a greater extent than males did. The positive influences of social concern goals on achievement are especially evident for female students who tend to adopt these goals to a greater extent than their male counterparts. Perhaps it is the mere adoption of these goals that is positively influencing female students’ achievement. Conversely, the fact that males are not adopting these goals could explain why the goals are not having an impact on their achievement. Alternatively, it is possible there are other underlying reasons as to why concern goals assist females in their learning and not males. This needs to be explored further in future research.

In addition to the social concern goals, the negative relation between affiliation goals and English achievement was only found for females and primary students. Since female students were found to endorse these goals to a
greater extent than males, it seems necessary for females to be specifically targeted by interventions in order to decrease these goals, or to translate them into social concern goals. That is, instead of being motivated by purely interacting with one’s peers, students need to be encouraged to combine this peer affiliation with an academic focus, such as helping each other with difficult work and sharing ideas. This latter theme of sharing ideas emerged from the qualitative study and will be returned to later.

One final point to be made about the impact of social goals on academic outcomes is the fact that such goals are culturally encouraged by the wider social and familial influences which exist within the PNG Melanesian culture. As outlined in Chapter 2, and as highlighted by some discussion in the qualitative study, PNG culture emphasises values that encourage looking out for one’s family and community needs as well as providing help and assistance wherever possible and in whatever form. The wantok system encourages individuals to engage in sharing behaviours and to always adopt a community orientation. Thus, when examined within this broader socio-cultural context, it is understandable that PNG students would adopt social goals. Furthermore, it is promising that social goals that are specifically focused on providing assistance, help, and showing concern (all characteristics of PNG cultural values) are positively related to academic outcomes.

In summary, analyses examining the relations between immediate motivational goals and student outcomes found that: (a) mastery goals, in particular task goals, were positively related to outcomes; (b) performance goals, in particular social power and praise goals, were negatively related to outcomes;
and (c) social concern goals and affiliation goals were respectively positively and negatively related to student outcomes. The next section outlines the key findings of analyses examining the influence of student academic self-concept on effort and achievement.

**Self-Concept**

The next psychological variable examined in McInerney's revised model of student achievement was academic self-concept. Three models were conducted, initially examining the influence of general academic, English, and mathematics self-concept on student outcomes, and then examining domain-specific and domain-general models of self-concept. Across all analyses, significant paths emerged consistent with past research. For the *domain-specific* effort model, the Internal/External frame-of-reference model (Marsh, 1986, 1990, 1993) emerged, whereby English positively predicted English effort, maths positively predicted maths achievement, maths and English achievement scores were positively related, and maths and English self-concept scores were negatively related. In the *overall* achievement model, maths self-concept was the only significant predictor and it positively predicted maths achievement, whilst for the *overall* effort model, English self-concept was the only positive predictor of English effort scores. Finally, for the *domain-general* model, general academic self-concept had a significant positive influence on general achievement.

These findings are important for two main reasons. First, they point to maths and English self-concept as being important predictors of student
achievement and effort outcomes. Causal research into the effects of self-concept on outcomes has supported the effect of prior self-concept on subsequent school grades. That is, the effects of academic self-concept are causally predominant over school grades, hence supporting a self-enhancement model (Marsh, 1990; Marsh & Craven, 2006). Since positive relations were found between English and maths self-concept and student effort and achievement outcomes for PNG students, it is plausible that this same positive effect of prior self-concept on subsequent achievement is applicable for a PNG sample. Thus, it would seem promising to simultaneously enhance academic self-concept and achievement in specific domains in interventions aimed at enhancing academic skills and effort. It still seems essential, however, for these relations to be investigated causally within PNG, utilising more than one wave of data. Also, further research could examine other sample groups across PNG in order to determine if the patterns of relations found in the current study can be generalised across PNG.

The second reason for the self-concept study’s importance stems from issues identified by Marsh, Byrne, and Yeung (1999) in their review of the self-concept literature. Marsh and colleagues identified a number of issues requiring further research, one being the examination of self-concept models in non-Western settings. Echoing this view, Marsh et al. (2006) stated that cross-cultural research is valuable and necessary for the testing of construct validity and the generalisability of self-concept conceptualisations. As discussed in Chapter 3, some cross-cultural research has been conducted investigating the I/E model and other reciprocal effects models of self-concept (Marsh et al., 2002; Hanover, 1995). Never before, however, has this research been extended to an Indigenous,
developing, and majority cultural setting such as PNG. Thus, the findings of the present study provide further support for the external validity and generalisability of the I/E model of self-concept in the context of a developing country sample.

The significant self-concept paths in the current study were generally consistent across the different groups under investigation. The domain-specific effort model, however, was mainly significant for male and secondary students. Although the reasons underlying this are unclear, it seems that self-concept interventions aimed at increasing students’ effort levels in maths and English will be particularly beneficial for male students in secondary schools. There were, however, significant self-concept paths for other groups (e.g., females and primary aged students) particularly for the achievement analyses. These results suggest that enhancing self-concept can be beneficial for a number of PNG groups.

To summarise, the self-concept analyses found support for the I/E model of self-concept when applied to students’ effort levels, and support for the positive influence of maths self-concept on maths achievement and general academic self-concept on general achievement levels. Hence, the results offer further support for self-concept theory and the research upon which it is based.

**Self-Regulation**

Finally, analyses were also conducted examining the relations between self-regulation and student effort and achievement outcomes across gender, grade, and region. Four significant paths were found between the self-regulation variables and student outcomes. Three significant positive paths were identified
and each of these relations involved the clarification learning strategies. Clarification strategies positively predicted both English and mathematics achievement, as well as mathematics effort levels. This clarification factor was the combined factor of monitoring and regulating learning strategies. As outlined earlier, the PNG students did not report a differentiation of these two types of strategies; instead they viewed them as a single technique whereby one would identify a problem and then intervene with appropriate problem solving and clarification processes. Thus, these techniques involving monitoring and identifying gaps in learning and responding to these gaps with appropriate regulating techniques, are positive learning processes and as such are promising strategies for informing intervention. They were also generally consistent across groups, except for the positive effect of clarification on mathematics outcome levels, which was only significant for females. It seems that these monitoring and regulating processes are particularly helpful for PNG female students in relation to mathematics.

In addition to the positive influences of clarification strategies on outcomes, planning learning strategies were found to have a negative influence on mathematics achievement levels for female and urban students only. As outlined in Chapter 3, planning strategies involve techniques such as setting learning goals, scanning pieces of text for key points, and activating prior necessary knowledge and information before the commencement of a task. It seems that students who have higher achievement in mathematics are not dependent on planning learning strategies. Perhaps this is because the relevance of scanning pieces of text and accessing prior information is not as important for
mathematics related activities as it is for English and comprehension types of tasks. Thus, students may be wasting valuable task completion time setting agendas and planning their learning activities, and not dedicating time to more useful learning strategies such as monitoring their work for problems and addressing these problems by seeking assistance. Furthermore, it is interesting to note that students who were performance goal oriented were also more likely to use planning learning strategies, and as outlined earlier, these performance goals were negatively related to mathematics achievement outcomes. When examined together in the overall model of student achievement, performance goals continued to have a direct negative effect on mathematics achievement, but the significance of the negative path between planning strategies and mathematics achievement decreased. Therefore, it might be the performance goals themselves that account for the most variance in their negative contribution towards mathematics achievement. These relations need to be explored in more detail, but regardless, the results suggest that students currently employing planning strategies in their mathematics classes could be encouraged to use clarification strategies as a positive alternative.

The above sections have highlighted and discussed the key findings of the separate psychological variable models by drawing upon past theory and research. Some of the relations that were found in McInerney’s revised model were also drawn upon to illuminate the mechanisms underlying these significant relations. The following section expands upon this discussion and highlights the key relations between the socio-economic variables, the psychological variables,
and student outcomes that were examined simultaneously in McInerney’s comprehensive model of student achievement.

**McInerney’s Revised Model of Student Achievement**

As discussed in Chapter 3, it is important to examine the combined influences of all the variables of interest within a single model in order to detect which factors contribute a unique amount of variance in their explanation of student outcomes. It is a vital step to determine which socio-cultural and psychological variables are the most important predictors of achievement and effort, so that future research and intervention studies can target those factors which account for the most amount of variance in student outcomes. For example, whilst some variables might positively or negatively predict student outcomes when examined individually, when all variables are examined within the comprehensive model, it might be found that some paths that were previously found to be significant are no longer significant when all variables are examined together. This indeed was the case in the current study. These key significant predictors of student outcomes within the comprehensive model of student achievement will be explored in the following sections.

**Socio-Economic Influences**

In his revised model of student achievement, McInerney emphasised the importance of examining external socio-cultural influences in students’ lives that might impact upon their goals, learning processes, feelings about themselves, and ultimately academic outcomes. Two of these socio-cultural influences were
targeted in the current study, and the relations between them, the psychological variables, and student outcomes were explored.

First, socio-economic status was measured, and the relations between it, the five psychological variables, and student outcomes were noted. Socio-economic status was found to be positively related to five other variables – students’ general academic self-concept, students’ use of clarification and planning learning strategies, and students’ English achievement and effort outcomes. As expected, socio-economic status was positively related to two of these factors (general academic self-concept and clarification learning strategies), which were in turn positively related to student outcomes.

Second, parent education levels were examined which are often viewed as one aspect of socio-economic status along with parents’ occupational prestige, income levels, and a family’s access to resources. In the current study, parent education levels were found to be positively related to seven psychological factors which at some point in the analyses were positively related to achievement or effort. These were students’ success future goals and instrumentality, village future goals and instrumentality, mastery and social motivational goals, and English self-concept. In addition to this, parent education was negatively related to three variables, two of which were negatively related to student outcomes. These were students’ authority-related future goals and perceived instrumental value. Parent education was, however, also negatively related to mathematics self-concept which was positively related to student outcomes.
These results suggest that students’ socio-economic influences, including parent education, are positive predictors of those factors which are beneficial to student learning outcomes and negative predictors of factors negatively related to outcomes, excluding the negative relation found between parent education and mathematics self-concept. This one result seems counter-intuitive and needs to be elucidated by future research. Despite this one paradoxical finding, all other positive relations between parent education and psychological variables resulted in positive effects on outcomes, and the negative relations resulted in negative influences on outcomes. Past research has suggested that parent education and socio-economic status variables exert their influence on other psychological variables and student learning outcomes via two main pathways – role modelling and high educational expectations (Khattri, Riley, & Kane, 1997; Lippman, Burns, McArthur, Burton, Smith, & Kaufman, 1996). Therefore, it is possible in the current study that students are both modelling their parent’s endorsement of particular future goals, instrumentality, motivational goals, self-concept, and learning strategies, and responding to the high educational expectations that their parents set for them by adopting positive influencers of achievement and effort. These mechanisms, however, were not directly targeted in the study and require further investigation. What is important though is that both socio-economic status and parent education had positive influences on a number of psychological variables which are important in the prediction of student academic outcomes. However, as discussed in Chapter 3, these socio-economic variables are often externally influenced and uncontrollable when one is looking to increase student effort and achievement levels in PNG classrooms. Therefore, the following
section examines the other internal, psychological variables and the relations
between them, which have been shown to have an impact upon student learning.

**Key Psychological Relations**

McInerney’s revised model of student achievement examines the
relations between socio-economic variables, future goal orientation, perceived
instrumental value, motivation, self-concept, self-regulation, and achievement
and effort outcome variables. It is beyond the scope of the current investigation
to summarise all influences at work in the model, therefore the following
discussion will focus on two main areas: first, the direct significant predictors of
student effort and achievement outcomes; and second, some of the key predictors
of these important psychological variables. These areas were selected as the
focus of this discussion because the centre of McInerney’s revised model and the
present investigation is student academic outcomes. Therefore, those variables
that significantly and either directly or indirectly influence achievement and/or
effort, were highlighted as the most important findings of the investigation.
These two areas will be outlined simultaneously in the following sections for
student achievement and effort analyses.

In the comprehensive model of student achievement, positive predictors
of English achievement were socio-economic status, parent education, village
future goals, and mastery goal orientations, whilst the positive predictors of
mathematics achievement were parent education, mastery goal orientation, and
mathematics self-concept. It is interesting to note that success goals and
perceived instrumentality, village perceived instrumentality, and clarification
learning strategies were no longer significant positive predictors of achievement when examined within the comprehensive model. In addition to these positive influences, there were three negative influences of English and mathematics achievement. Students’ authority instrumentality and performance goal orientations negatively predicted both English and maths achievement, and students’ adoption of authority future goals negatively influenced their English achievement only. Planning learning strategies were no longer significant negative predictors of mathematics achievement in the overall model.

Thus, it seems that the variables accounting for the majority of variance in the achievement outcomes were the socio-economic variables, the motivational variables, mathematics self-concept, village goals, authority goals, and authority instrumentality. Logical areas to intervene to increase student achievement levels are by increasing students’ mastery goal orientations, village future goals, and mathematics self-concept. Areas for intervention that can reduce the negative influences of achievement are decreasing students’ performance goal orientations and decreasing both authority future goals and authority perceived instrumentality.

In addition to the achievement model, McInerney’s revised model was also tested for the student effort data. Positive influences of English effort were socio-economic status, parent education, village future goals, success instrumentality, mastery goal orientations, and English self-concept. There were no negative influences of English effort. In addition to this, the positive influences of mathematics effort were parent education, authority future goals, and mastery goal orientations, whilst the negative influences were authority
instrumental value and performance goal orientations. Consistent with the achievement analyses, authority instrumentality and performance goals were negative predictors of mathematics effort. However, it was also interesting to note that authority future goal orientation was actually a positive predictor of mathematics effort levels. Hence, it appears that there might be an interplay at work between students’ authority future goals and the value students place on school in achieving them. In the individual interaction analyses, authority future goals were found to negatively influence student English effort only in the presence of authority instrumentality. It appears that holding these authority or status-related goals, but not putting emphasis on school as a means of helping one achieve these goals, is significantly and positively contributing towards the effort applied by students in mathematics. However, since these goals had a negative effect on English achievement, future research should examine them further, before attempting to increase their importance in order to increase effort.

In addition to this, future research is needed to examine the interaction between future goals and perceived instrumentality within the context of this comprehensive model of student achievement for success, authority, and village orientations.

As with the achievement analyses, none of the self-regulatory learning strategies were significant predictors of English or mathematics effort scores. Therefore, areas that seem logical for effort interventions are: (a) increasing mastery goals and decreasing performance goals; (b) increasing village goals and success instrumentality, and decreasing authority instrumentality; and (c) increasing English self-concept.
In addition to the relations between the psychological variables and student outcomes, the model also allowed for the identification of relations between the psychological variables themselves. Due to the directional flow of the model, it was possible to identify those variables which significantly predicted variables that predicted student outcomes. One such variable was students’ success future goal orientations. These were positive predictors of both mastery and performance goal orientations and English and mathematics self-concept. It appears that students who hold goals such as getting into university and gaining employment, are more highly motivated by goals that involve mastering a task and learning for learning’s sake, and goals that involve peer comparisons, social power, and competition. Thus, students who adopt either mastery or performance achievement goals are being motivated by future success-oriented goals. In addition to their immediate achievement goals, students who are success-oriented also report higher English and mathematics self-concepts. Therefore, those PNG students who desire to graduate from high school, earn money, and get a job, reported that they believe more strongly in their English and mathematics abilities.

In addition to success goals, authority goals were found to be negative predictors of mastery motivation and positive predictors of performance goal orientation. This finding is not surprising given the already established negative relations between authority goals and outcomes and performance goals and outcomes, and the positive relation between mastery goals and outcomes. Students, who are motivated by future authority and status goals, are therefore more likely to be motivated by immediate performance and authority-related
goals such as competition, doing better than others, and holding positions of power. This relation is logical and expected. It does, however, have an ultimately negative influence on achievement and effort outcomes and therefore attempts should be made to translate these goals into the adoption of more effective future and immediate achievement goals.

Village-related goals and instrumentality had differential effects on other psychological variables. Whilst they positively predicted mastery goals, they negatively predicted performance goals and both English and mathematics self-concept. It is understandable that students who have a village focus would be less inclined to adopt goals related to standing out, receiving attention and praise, and competition for status positions. As outlined earlier, a PNG village lifestyle often involves sharing, cooperation, and wantok systems whereby the focus is not on gaining positions of power or competing with one’s peers. The negative relation, however, between village orientations and students’ resulting self-concept is more complicated. This may be a result of students’ socio-economic status and access to educational resources, or it may be a result of village-induced feelings of inferiority or incompetence. For example, if village-oriented students are low in socio-economic status, do not have access to further education, and come from villages that hold ambivalent attitudes towards education, the result may be feelings of incompetence in academic work. This study, however, did not directly examine these underlying mechanisms and further research is required to gain a more complete understanding.

Finally, mastery goal orientations were positively related to mathematics self-concept and social goal orientations were negatively related to mathematics
self-concept. It seems that students who are motivated by goals that involve mastering one’s work and increasing their level of understanding are ultimately feeling more confident in their mathematical ability. Conversely, students who are motivated by social affiliation and concern goals do not hold high beliefs in their mathematical abilities. Given the direct positive relation between mastery goals and outcome measures found for the current sample, it seems a promising construct for informing intervention as increased mastery orientations are related to increased student outcomes directly and indirectly, via self-concept pathways.

Summary

This section has examined the key relations that emerged between students’ socio-economic status levels, their future goals, perceived instrumentality, motivation, self-concept, and self-regulation levels, and their achievement and effort outcomes, within the framework of McInerney’s revised model of student achievement. Many of the highlighted relations were consistent with findings from past research, whilst some were specific to the PNG sample. Importantly, the model highlighted key promising constructs that can serve to inform interventions aiming to enhance academic outcomes.

Discussion of Study 3 Key Findings

This section examines the key findings from the qualitative study of the current investigation. These findings will be discussed in the order of four main themes that became evident throughout the presentation and analysis of the qualitative data. These themes were: (a) the internal characteristics of the PNG
student; (b) the characteristics of the school, the teacher, and educational instruction; (c) the relations between the PNG student and their family; and (d) the effect of the broader social and cultural environment. Study 3 had two main purposes. First, the study aimed to enrich, through student, teacher, and parents’ own words, the key results that were found in the quantitative studies. Second, the study aimed to extend our understanding of the influences of PNG students’ educational experiences, beyond the internal characteristics that were targeted in Studies 1 and 2. Therefore, the study examined additional themes emerging from students, teachers, and parents that were identified as being additional determinants of student academic outcomes. These findings will be explored in the following sections.

**Internal Psychological Characteristics**

One of the purposes of the qualitative study was to examine data from students, teachers, and parents in order to illuminate and provide depth to the key findings of the quantitative data analyses. Thus, the qualitative analyses also brought forward data pertaining to four of the five psychological variables that were targeted by the quantitative analyses. In addition to illuminating the quantitative findings, the qualitative analyses were also successful in identifying additional emergent themes, concerned with the internal, psychological characteristics of students in PNG, and how these relate to student learning and achievement processes. What follows is a discussion of the main internal student themes that emerged from the qualitative analyses.
As outlined in the previous chapter, eight future goal themes and nine perceived instrumental value themes emerged from the student, teacher, and parent interviews. The most frequently reported future goal was to embark upon further studies, whilst the most frequently mentioned instrumentality category was the importance of school for helping one to gain employment. Interestingly, all of the future goals that students mentioned fell into either the success or village categories that were targeted in the quantitative analyses. Furthermore, it was these two types of future goals, and their related instrumentality, that were positively related to student achievement and effort outcomes. It seems that the study’s PNG students are adopting these positive success and village goals to a greater extent than they are adopting authority goals, which are negatively related to student outcomes. This is a promising finding for two main reasons. First, an attempt can be made by educators to encourage students in the adoption of these success and village goals in order to increase positive student achievement and effort outcomes. Second, given the limited post-educative ‘success’ opportunities in PNG, the fact that students are still naturally endorsing village-oriented goals is extremely positive. Holding these goals appears to not only be preparing them for life in the village in PNG – the most likely outcome for the majority of PNG graduates – but also appears to be positively related to current schooling outcomes.

In addition to future goals and instrumentality, a number of motivational themes also emerged. Students discussed their mastery goal orientations and their social affiliation and concern orientations consistently with the variables targeted in the quantitative analyses. Students’ comments distinguished social concern
goals from affiliation goals, and provided further information on the positive relations between social concern goals and achievement and the negative relations between affiliation goals and achievement. Students highlighted distraction and other non-beneficial behaviours as problems that arose from working with peer groups and being motivated by affiliation goals. Alternatively, when there was still an academic focus in working with one’s friends (e.g., helping each other with difficult exercises), students highlighted the positive outcomes this had on their learning experiences. Thus, these findings are consistent with the quantitative analyses.

In addition to the two concern and affiliation social goals, a third type of social goal emerged in the qualitative analyses that was not targeted by the quantitative studies. This was the social goal of sharing. Students discussed the sharing of practical materials and belongings, as well as the sharing of knowledge and academic ideas within interactive peer environments. Students reported these experiences as being beneficial to their learning. Future research could examine these sharing orientations amongst PNG students and how they relate to other psychological variables, as well as academic effort and achievement outcomes. It would also be interesting to elucidate the prevalence of such sharing orientations amongst other cultures to examine any cross-cultural similarities and differences in motivational profiles.

Performance goals were also found in the qualitative data. However, only competition goals emerged as a significant theme. Students spoke of these goals favourably and emphasised the positive motivating elements of these goals in helping them strive towards better outcomes. These goals, however, were not
found in the quantitative analyses to be either positively or negatively related to student outcomes. Perhaps it is the combined influence of holding these competition goals in conjunction with another type of goal, such as mastery goals, which results in the positive influence on outcomes that students spoke of in their interviews. Future research therefore needs to investigate the interactions between mastery, performance, and social goals in cross-cultural settings, including PNG. Such interactions should then be included within future models of student achievement, such as McInerney’s model.

Furthermore, neither praise nor social power performance goals that were significant negative predictors of student outcomes in Study 2, emerged as significant themes in the qualitative analyses. In order to increase our understanding of the processes underlying these negative relations that were highlighted by the quantitative studies, future qualitative research specifically targeting these orientations could be undertaken.

The emergence of the ‘good-grade’ goals also occurred in the qualitative data, but was not targeted by the quantitative studies. Past research has debated the linkage of these grade goals to other forms of motivational goal orientation. Some studies suggest that they correspond with performance goals in that the grade acts as an external reinforcer of achievement (Ryan & Deci, 1989). Other studies, however, suggest that since the good grades are reflective of positive effort and achievement, then they can be considered to be linked with a mastery goal orientation and positive achievement outcomes (Barron & Harackiewicz, 2001). The PNG students spoke of these goals as having positive influences on their learning outcomes. However, future research is still required to examine the
underlying mechanisms of these grade-related goals, as well as examining their relation with other psychological variables and student outcome measures.

Also emerging from the qualitative data were immediate family-related motivational goals. These were different to students’ future family goals which were goals situated in the future to which students were striving to achieve. Students’ immediate family goals were goals that influenced the students’ current behaviour in school. For example, students would report applying extra effort because they knew their family expected it of them or because they wanted to be appreciative for the opportunity they were given. Again, our understanding of these goals would benefit by quantitatively examining the relations between this type of goal orientation and student achievement and effort levels. Furthermore, future research could examine the relations between these immediate motivational family goals, students’ future family goal orientations, and the perceived instrumentality of school in helping them achieve these family goals.

Finally, data from the qualitative study found that students’ monitoring and regulating strategies were the most frequently reported self-regulatory learning strategies. As mentioned earlier, the data also supported the decision to combine these two factors into a single factor, as students perceived these as an overall clarification strategy. Again, combining the quantitative and qualitative findings on these strategies yields promising findings, because the most frequently endorsed learning strategy by students was also the learning strategy that was positively related to student outcomes. These results suggest that it may be useful to encourage students’ use of clarification strategies as well as
providing opportunities for the learning of and availability of resources for students to successfully carry out clarification processes in their schoolwork.

A qualitative discussion surrounding self-concept was not directly targeted by the interview schedule utilised in the current investigation. Future qualitative research therefore might examine student, teacher, and parent perceptions of students’ self-concepts and their role in the learning process.

To summarise, the qualitative data confirmed and enriched many of the quantitative findings. In addition to the themes that were specifically targeted in the quantitative analyses, a number of additional themes emerged including students’ social sharing goals, good-grade goals, and immediate family-oriented goals. The following section examines some of the external influences of the school, the family, and the environment, that emerged as contributing to students’ learning experiences in PNG.

**External Characteristics**

McInerney’s revised model emphasised the importance of examining students’ psychological experiences within the context of the broader socio-cultural environment. Although socio-economic status and parent education were examined in this role in the quantitative analyses, the qualitative analyses identified a number of additional important influences of student learning in PNG. These were the external influences of the teacher and school, the child-family relationship, and the broader socio-cultural environment. These will be outlined in the following sections.
Teacher and School Characteristics

A number of themes emerged in the qualitative analyses concerned with the characteristics of the teacher and the instruction environment, which were seen to serve a role in student learning. Students firstly identified six key characteristics which they perceived as defining a ‘good’ teacher. These included aiding understanding, explaining with examples, monitoring students’ progress, appearing warm and friendly, being patient and understanding, and always being approachable to ask questions. As outlined in the previous chapter, many of these teacher characteristics had obvious parallels with the internal characteristics of students that were examined in the above sections. These teacher characteristics, therefore, could be seen to influence a students’ mastery and social goal orientations, as well as the particular learning strategies they adopt. Particularly, the teacher characteristics seemed to model clarification learning processes for students by teaching them how to monitor their work and by being available for regulating and help-seeking processes.

It is unclear from the current study’s findings, exactly how these teacher characteristics relate to student learning outcomes. Students were simply asked to define what characteristics they thought constituted a good teacher. Future research might therefore consider examining the characteristics of and impact of particular quality teaching styles in PNG classrooms and how they relate to student outcomes.

A second theme that emerged consistently throughout student, teacher, and parent interviews in the qualitative study was the issue of language. Many difficulties were highlighted concerning the language transition that students
were required to make from their *Tok Ples* or *Tok Pisin* languages to English during early primary school. It seems that there are two differing opinions as to the most effective teaching strategies to be employed during this transition period. Some teachers emphasised the importance of using a common language such as *Tok Pisin* to aid students’ language transition. Teachers highlighted *Tok Pisin* as the language most common to people in PNG especially when they come from differing regions, and hence different language groups, throughout the country. Teachers especially in remote, village areas in PNG emphasised that often teachers do not speak the vernacular language of the village they are teaching in and often these students have had little exposure to the English language prior to coming to school. Therefore, *Tok Pisin* is the only language that both parties can understand and must be utilised for educational instruction. Other teachers identified a number of problems that result from the use of *Tok Pisin* in educational instruction, and hence employ restrictions on using languages other than English in their school environments. These teachers highlighted issues that may arise, surrounding students’ incorrect use of *Tok Pisin* and English words, due to the fact that *Tok Pisin* originally developed out of a broken form of the English language. When students were questioned about these language issues, they also highlighted the confusion they often experience between *Tok Pisin* and English languages. Some of these students, however, reported the implementation of particular learning strategies that were targeted towards overcoming language issues, such as reading books written in English.

Although a full discussion of the implications of the problems related to language diversity and instruction in PNG is beyond the scope of the current
study, these linguistic issues and problems are in need of significant further investigation. One of the purposes of highlighting the English – Pidgin language transition was to discuss the fact that students were reporting the use of helpful learning strategies that they utilise to assist in their learning. However, many of the issues pertaining to effective language instruction and optimal teaching and learning environments for young Pidgin speaking students remain to be elucidated by future research.

In summary, characteristics of the teacher and the language of instruction were identified as contributing towards a students’ learning experience. In addition to these important influences are the relationships experienced by students between themselves and their families. These relations will be briefly discussed in the following section.

**Child – Family Relationship Characteristics**

The theme of child-family relationships emerged consistently throughout student, teacher, and parent interviews, and was identified by participants as an important influence on multiple constructs. These included: future goals, value placed on school, motivation, and learning strategies.

Family-oriented goals were reported by many students and themes of responsibility surrounding supporting one’s family were evident in the data. Themes of supporting one’s parents, repaying one’s family (both monetarily and in service), and showing gratitude for one’s schooling experiences were mentioned consistently by students. Parents further emphasised these issues by stating that they expected their children to perform successfully in school so that
one day their children could support them and repay them for the money invested in their education.

These reported expectations of support and repayment in PNG are not so much burdens as they are common understandings. Not a single student complained about their perceived responsibility to support their families, nor did they speak of it as burdensome or oppressive. Instead, these responsibilities were viewed as stemming from three main reasons: (a) genuine gratitude and appreciation; (b) cultural responsibility; and (c) an understanding of the hardships of PNG life.

First, in their discussion of the family goals, the value they place on school in reaching these family goals, and immediate family motivating factors, students consistently reported feelings of gratitude and appreciation which appeared to be genuine and non-burdensome. This gratitude was in response to the reported recognition of the huge investment that families in PNG have to make in their children’s education. It was also often mentioned in response to the sacrifices that students saw their parents making throughout their schooling years so that they could experience the privilege of attending school. Furthermore, students seemed to be combining this gratitude with a genuine enjoyment of and appreciation of school. Almost all students spoke at least once of their enjoyable experiences at school and how this idea of family gratitude made them apply more effort to their studies.

Students, teachers, and parents also highlighted the cultural responsibility that is evident in PNG, for children to look after their families in the future. Consistent with the wantok system in PNG, and the family- and community-
oriented Melanesian ways of living, students discussed their responsibility to support and repay their families because of cultural expectations. These expectations were imposed upon them by a variety of sources including their parents, teachers, village elders, and key influences in their broader community. Again, students did not discuss this responsibility as being burdensome, but instead simply recognised and internalised the responsibility as culturally determined.

Finally, students also recognised the enormous sacrifices their parents had made throughout their schooling years, because of the immense hardships imposed by poverty in a developing country. Students had either experienced this poverty directly, or via witnessing others known to them experiencing poverty, and so were not unaware of the realities of PNG hardships. Therefore, they reported an internal desire to alleviate some of these hardships for their parents in the future. They saw gaining employment, completing further studies, developing skills and knowledge, and earning money as particularly important for achieving these goals.

This theme of surviving PNG poverty-related hardships will be discussed in more detail in the following section. In summary, the student-family relationship, defined particularly by student responsibilities to support and repay their family, appeared to be an important influence upon students’ learning and educational experiences. Future research might consider specifically targeting this relationship and its impact upon objective student outcomes, as well as examining it within a broader cross-cultural context.
Broader Socio-Cultural Characteristics

Finally, the influence of the broader socio-cultural environment was also discussed as serving a vital role in student education in PNG. Whilst socio-economic status and parent education levels were examined in the quantitative analyses, these analyses did not directly target some of the specific realities of PNG life. These realities did, however, emerge in the student, parent, and teacher qualitative data.

One of the main themes that emerged from the participants’ discussion of the perceived instrumental value of schooling was surviving PNG hardships. Students, teachers, and parents believed that gaining an education was an important pathway for helping a student to avoid a life of poverty. The issues surrounding this theme, however, were different for students from village and rural areas and students from urban regions in PNG.

Students from urban regions in PNG said that education might prevent them from ending up ‘living off the streets’ in PNG cities. These students are often exposed to poverty and crime in urban areas and no doubt have some understanding of the lack of employment, the crime and violence rates, and other health-related issues that are prevalent in PNG. When asked what children who did not receive an education would end up doing, these students often gave responses along the lines of finding themselves involved in crime, living on the streets, going hungry, and attempting to earn money in ‘lowly’ jobs. Education was seen as a pathway for gaining knowledge and skills that would enable a student to either, embark upon further studies, gain employment, or transfer that knowledge to their communities for sustainable development.
Alternatively, students from village and rural areas said that they saw education as a means to relieving them from the hardships associated with subsistence-based village lifestyles. Some students discussed how school would provide them with training and knowledge to allow them to make useful and productive contributions to their communities, such as sustainable development and agricultural enhancements. Other students suggested that education would provide them with access to a job and money that would help to alleviate food and resource-related poverty in their home communities. Furthermore, some students saw school as a pathway for escaping their village lifestyles. Some students who were living in extremely remote regions in PNG seemed to have idealistic expectations for what ‘city-life’ would bring to their lifestyles. Some did not appear to be aware of the reality of the situation in cities such as Port Moresby, and suggested that simply by following the ‘bright lights’ of urban lifestyles, their hardships in life would ease. Although these goals were reported as motivating factors in the effort students applied to their studies, some caution must be highlighted when considering the implications of such findings. As discussed in Chapter 2, in 1990 the Secretary of Education in PNG emphasised the need for schooling to be relevant for an individual’s future that is most likely going to be based within a subsistence-based village. Given the extreme unemployment rate in PNG, schooling practices were encouraged that emphasised the importance of preparing students to return to their home communities and to make beneficial contributions to them. Thus, given there has been little to no alleviation of the unemployment problems facing PNG society in the last seventeen years, future education might well focus on simultaneously
maintaining the success-oriented goals of students (since they positively influence outcomes), and preparing them for an effective future in their home villages. Such an effective village-based future might include reforms involving the building of economic revenue as well as village economic, technological, and academic capacity. Further research would be useful to test the efficacy of such reforms.

Additional research is also required to investigate the impact of the broader socio-cultural influences upon various psychological factors and student outcomes in PNG. This section, however, has highlighted the differing viewpoints of students from different regions in PNG, and how they perceive and deal with knowledge of the hardships of PNG life.

**Summary**

This section has presented a discussion of four main themes that emerged from the qualitative data and has attempted to link these themes with the quantitative studies and some suggestions for further research and intervention. The four themes that were examined were the internal psychological characteristics of the child, the influences of the teacher and educational instruction in PNG schools, the characteristics of the child-family relationship, and the role served by broader socio-cultural influences in PNG students’ schooling experiences. The final two sections that follow, highlight some of the strengths and weaknesses of the current investigation, and present a summary of the main areas of focus for future research and intervention.
**Strengths and Limitations**

The current investigation had a number of strengths and some limitations. A particular strength of the current study was the implementation of a mixed-method research design combining both quantitative and qualitative data collection and analysis techniques. Recent trends in the literature have advocated the implementation of such mixed-method research designs particularly when involving cross-cultural and sensitive research (Sechrest & Sidani, 1995). There are many advantages to the combined use of quantitative and qualitative methods. First, the quantitative studies allowed for the objective conceptualisation and measurement of the socio-economic, psychological, and outcome variables under investigation in the current study. They also allowed for the rigorous testing of the psychometric properties and factorial invariance of such instrumentation. This is a particularly important finding given the remote, unique setting of the current study. The quantitative studies demonstrated the appropriateness of extending the use of traditionally Western constructs for effective research with Indigenous, non-Western people in PNG. The reliability, validity, and factorial invariance of these constructs were each confirmed in the PNG sample, allowing for analyses to be conducted examining the nature of these psychological variables amongst the PNG people studied. Second, the quantitative studies allowed for the investigation of statistical relations between exogenous and endogenous latent variables, and for the most important predictors of student outcomes to be identified within the context of all other variables.
The qualitative study also enabled two important processes. First, the qualitative analyses illuminated and gave depth to the statistical relations found between variables in the quantitative model. Second, the qualitative study highlighted significant influences of student learning experiences in addition to those that were purposefully and directly targeted in the quantitative studies based on a review of the literature. This enabled culturally specific influences to be highlighted and discussed in the context of the PNG education system.

A further strength of the current investigation was the use of a comprehensive model of student achievement that examined the combined influences of a number of socio-economic and psychological variables. As outlined in Chapter 3, some recent theorists had emphasised the need to examine multiple psychological variables and their relations with student outcomes within the context of a students’ broader socio-cultural environment. The current study implemented such an approach by using McInerney’s revised model of student achievement and examining it within the context of PNG students’ school characteristics, student-family relationships, and the broader socio-cultural and economic environment. The result of this approach was to identify the key variables that uniquely and significantly contributed to student outcomes, allowing the identification of key promising constructs that can serve to inform intervention.

The present investigation also utilised a range of rigorous statistical methods that ensured the validity, reliability, and invariance of all instrumentation across specified groups in PNG. Furthermore, the study adopted a selection of the most recent advances in statistical techniques to measure the
relations between the socio-economic, psychological, and student outcome variables. Techniques such as SEM and MIMIC modelling allow for these complex relations to be investigated, without relying on directly observed scale scores that do not account for model measurement error. Thus, a more complete understanding of the interrelations and underlying mechanisms involved in student learning and achievement processes could be gained.

Finally, the current study employed a number of measures to ensure that all data collection processes undertaken were culturally relevant and sensitive. This ensured that: (a) participants did not feel pressured or coerced to participate; (b) the data and resulting model were accurately based within the socio-cultural environment of the regions in PNG where data was collected; and (c) resulting suggestions for interventions and future research were culturally appropriate. During the data collection process a number of measures were taken to ensure the cultural relevance and appropriateness of the research. These included the use of mediators, the use of translators, the approach and liaison with village elders and community leaders, and discussions with school and government leaders in PNG. Thus, there were a number of key strengths of the investigation, resulting in a statistically rigorous, yet culturally sensitive model of student achievement, for use in PNG.

In addition to these strengths there were some limitations of the current study, which need to be considered when interpreting the results and designing future research and intervention in PNG. First, due to time, financial, and other practical constraints, the current study only collected a single time-wave of data, thus the study was cross-sectional in design. Although the relations between the
socio-economic, psychological, and outcome factors were examined across a number of groups in PNG, a stronger investigation of the interplay between these variables would require a longitudinal research design. This would involve the collection of at least two time waves of data and statistical techniques to test strictly ‘causal’ relations between the variables of interest. Since the current study only utilised one time-wave of data, it was not possible to infer causality, nor test for reciprocal effects. Therefore, it would be useful for future research to employ a longitudinal causal ordering design to further elucidate McInerney’s revised model of achievement in PNG.

Another limitation of the study was the small sample size of the village group, which limited the external validity and statistical power in some of the more complex models. However, given the remote villages that were used as the research settings for the village sample, the collection of one-hundred and forty participants was still considered to be a representative sample of a population that is extremely difficult to access. This was due to the extreme and arduous nature of the data collection across the five remote villages and the many environmental and practical obstacles in gaining this access. Future research should consider ways to access a greater number of participants who are located in these remote villages and to ensure that the data collection process involves local community’s cooperation and assistance in the access procedures.

Not only was the village sample of participants small, there were additional limitations associated with the lack of rural primary and village secondary students. Whilst it was only feasible for rural secondary and village primary students to be obtained for the current research, these sample restrictions
may implications for the interpretation of the study’s MIMIC results. In Chapter 6 and 7, MIMIC models were performed, examining the differences in students’ responses to the questionnaire across Grade levels. Thus, whenever differences were found between primary and secondary students on particular factors (Chapter 6) or particular paths (Chapter 7), it is possible that these could be attributed to regional area. For example, when secondary students were found to be higher than primary students in task motivation, it is possible that this could be reflecting the predominantly rural and urban sample being stronger than a village sample on task motivation. Furthermore, when primary students were higher than secondary students on social power motivation, it is again possible that this is reflective of village students being higher than rural and urban students on this particular variable. These findings do require further clarification, however it is important to note that in PNG, most (if not all) village regional areas do not have secondary schools operating in them.

Finally, as with much cross-cultural research, the issue of social desirability may have been an influence of some of the study’s findings. Given that Western researchers were involved in the data collection processes for both the quantitative and qualitative studies, it is possible that students may have responded in a socially desirable manner. Students from urban, rural, and village regions may have responded with different response or socially desirable biases, to the presence of these Western researchers. However, in an attempt to counterbalance this, mediators, in the form of teachers, parents, and communities elders were consistently used in all data collection processes, and student honesty was emphasised over providing ‘correct’ or ‘incorrect’ responses.
Future research might consider the strengths and limitations of the current study when designing and implementing research programs examining similar models in PNG to the one tested in the current study. The next and final section presents a number of suggestions for theory, future research, and interventions for practitioners and other stakeholders in PNG.

**Implications for Theory, Research, and Practice**

The results of the current study have implications for theory, future research, and educational practice in PNG. McInerney’s revised model of student achievement provided a useful framework for conceptualising and understanding a broad range of psycho-social influences upon student academic outcomes in PNG. This model was particularly useful because of the broad number of variables that it included and the hypothesised directional flow of these variables. As outlined in Chapter 3, much prior research has investigated the impact of psychological variables upon student outcomes in isolation. The current study, by utilising McInerney’s revised model, was able to examine the combined influence of a number of predictors of student outcomes and determine which variables are the most important for future research and intervention in PNG. Furthermore, McInerney’s model was useful in that it was situated within the socio-economic context of the PNG student learner. Such socio-economic information enables more variance in the students’ educational outcomes to be accounted for and is particularly essential when conducting research in a developing country such as PNG.
It is important to note, however, that the current research was exploratory in nature. That is, since no research of its kind has ever before been conducted within the PNG context, it was not possible to make predictions concerning the similarities and differences in PNG students’ endorsement of the psychological variables across groups, nor the relations between the psycho-social constructs and outcome variables. Interestingly though, it seems that PNG students do recognise the constructs of future goals, instrumentality, motivation, self-concept, and self-regulation (with some modifications) in similar ways to those Western samples upon which the instrumentation was developed. By adopting an Indigenous approach to research, the current investigation was able to employ a combination of *emic* and *etic* research principles and identify those influencing factors of student outcomes that have been examined in other cross-cultural settings, as well as those that are specific to PNG. In doing this, the investigation allowed for the discovery that these Western constructs were interpreted in similar ways by the PNG sample to the original Western samples, and that the instrumentation is thus appropriate for uncovering the important influences of PNG student outcomes. This has also opened up the possibility of conducting cross-cultural research in the future by comparing PNG students’ responses to Western students’ responses to examine factorial invariance, and the similarities and differences in their endorsement of these motivating influences of student outcomes.

However, the approach also allowed for the identification of a number of additional, PNG specific factors that played vital roles in the learning processes of the PNG sample. The study identified a number of additional psycho-social
variables that were not included within the model of student achievement but that emerged as serving important roles in PNG students’ educational experiences. Additional motivation constructs, such as a sharing goals and ‘good-grade’ orientations, and linguistic contributions, such as the language of instruction in PNG, were found to contribute to PNG students’ learning experiences. Such additional constructs should be included in further research and incorporated into integrative models, such as McInerney’s revised model of student achievement, in order to gain a more comprehensive understanding of student education in cross-cultural settings.

Furthermore, the current study found that some constructs need to be reconceptualised for use in PNG which has implications for the generalisability of these psychological variables across cultures. Self-regulation particularly required re-conceptualisation (the merging of monitoring and regulating strategies and the exclusion of organisation strategies) and integrative models being utilised in developing contexts in the future need to investigate these constructs in more detail.

In addition to the implications for theory, the current study has also highlighted a number of suggestions for future research. Future research on the influences of student learning and achievement processes in PNG could respond to the limitations discussed earlier of the present investigation by: increasing targeted sample sizes; implementing causal ordering and reciprocal modelling within the context of a longitudinal study with more than a single-time wave of data; and always collecting data in a culturally sensitive and appropriate manner. In addition to these suggestions, future research could pursue some of the
unresolved issues that emerged in the current study. One such issue was the insignificant role that self-regulatory learning strategies were found to serve in the final overall model. Learning strategies have been found in the past to serve vital roles in the prediction of positive student outcomes. In the current study, when examined separately, clarification strategies were found to be significantly and positively related with student outcomes. However, when all variables were examined simultaneously, these strategies no longer contributed to student outcomes. Further research could clarify this finding utilising larger sample sizes and longitudinal research designs, to enrich our understandings of the most important predictors of student outcomes in cross-cultural settings.

Other findings that require further investigation were the additional themes that emerged from the qualitative analyses. Future research could examine the relations between the key socio-economic and psychological variables, student outcomes, and quantified measures of student sharing goals, good-grade goals, immediate family goals, and additional learning strategies employed by PNG students. Other themes such as the characteristics of quality teaching and parental support and their impact on student learning could also be further elucidated in future research.

The issues that emerged in the present investigation surrounding the language transition period between elementary and primary school, require more thorough investigation. Although this was not a focus of the current study, this theme emerged in the qualitative data analyses. Future research is needed to determine whether one form of language instruction is effectual or whether
different forms of language instruction are effective for different cultural groups within PNG.

Finally, future research could consider cross-cultural comparisons between students from PNG and students from other Indigenous, developing, and majority cultures. Such research may serve to identify important cultural and environmental influences that predict student psychological and outcome variables in the context of developing countries.

In addition to contributions to theory and suggestions for future research, the current investigation identified a number of useful strategies that could serve to inform intervention in PNG. Specifically, these strategies involve increasing students’ mastery motivation, village and success goals and instrumentality, and domain-specific self-concept, and decreasing students’ performance motivation, and authority goals and authority instrumentality. Given that the success, authority, and village conceptualisation of future goals and instrumentality is specific to PNG, future research is required to determine the most effective ways of increasing specific success and village-related goals and decreasing authority goals. However, educators, families, and community leaders should be made aware of the positive and negative implications involved in encouraging or discouraging either type of goal. As discussed earlier, the encouragement of both village future goals and instrumentality is consistent with the current viewpoint of the Department of Education in PNG. Thus, the promising findings in the current study, that these village orientations are positively related to student outcomes, complement these views, and support the continued encouragement of students’ being oriented towards future village-based lifestyles. Further positive
outcomes will result when such village future orientations are combined with an increased emphasis upon capacity building and village-based economic support. An intervention as such is required at a social and political level in PNG.

Furthermore, research is available advising the most effective ways of increasing mastery learning environments and decreasing performance environments. According to Morgan (2006), in order to foster a mastery learning environment, students need to be allowed to set their own personal work and study goals, work on a variety of inclusive tasks, study at their own level of ability, and be involved in study-related decision making processes. Furthermore, teachers can encourage such environments by privately and independently encouraging students for the effort applied and progress made in their school and home work tasks, allowing flexible study time for individual improvement, and grouping students into cooperative classroom groups. Teachers should also attempt to decrease any aspects of the learning environment that encourage performance-oriented goals. Such performance-oriented classrooms encourage uni-dimensional competitive tasks, strict teacher authority, normative based public recognition and evaluation, competitive ability-based groups, and inflexible time to practise. Thus, teachers need to focus on decreasing existing performance-orientated characteristics of their learning environments and instructional practices.

The current study also suggested that students’ domain-specific self-concept levels be increased in order to have positive effects on their effort and achievement levels in the corresponding domain-specific subjects. This was particularly evident for students’ effort levels, and for the influence of
mathematics self-concept on mathematics achievement. Effective self-concept interventions are directly targeted towards increasing domain-specific self-concepts, and the intended goals must match the expected outcomes. These domain-specific self-concept interventions have been found to be more effective than targeting global measures of self-esteem (Craven, Marsh, & Burnett, 2003; O’Mara, Marsh, & Craven, 2004, 2005). For example, an intervention designed to enhance reading skills could target both reading self-concept and reading ability simultaneously. Positive feedback techniques have also been shown to be significant predictors of enhancing students’ academic self-concept levels (O’Mara, Marsh, Craven, & Debus, 2006).

Such interventions targeted at changing students’ self-concept, future orientations, and motivation, need to be carefully monitored as they are applied in PNG classrooms, to ascertain whether they can be effectively transferred from Western settings to this cross-cultural educational setting. Future research could elucidate the effectiveness of such interventions.
Summary

This chapter has outlined the key findings from the quantitative and qualitative analyses, examining the relations between socio-economic factors, students’ psychological influences, and student academic outcomes. Significant influences of effort and achievement outcomes were discussed, and McInerney’s revised model of student achievement was situated within students’ broader context of external school, family, and socio-cultural environments. Findings from the three studies were drawn together, and strengths and limitations of the investigation’s research design were presented. Finally, suggestions for theory, future research, and practice were reported. The pivotal findings of the overall investigation are summarised in the following concluding chapter.
CHAPTER TEN
SUMMARY AND CONCLUSIONS

The current investigation has elucidated some of the key determinants of academic achievement and effort outcomes for Papua New Guinean students. As discussed in Chapter 2, a limited amount of research has been conducted in cross-cultural settings defined as Indigenous, developing, and comprising a majority population and this research has directly responded to this shortfall. Employing a synergistic blend of quantitative and qualitative methodologies, the current investigation has identified some of the key socio-economic, cultural, and psychological influences upon the learning outcomes of students from urban, rural, and village regions in one such cross-cultural setting – PNG.

In achieving these aims, the investigation conceptualised the study of student educational outcomes within the framework of a comprehensive model of student achievement. McInerney’s revised model of student achievement conceptualises socio-economic status, parent education, future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation as vital factors influencing students’ effort and achievement outcomes. By examining this directional, comprehensive model in PNG, the current investigation was able to determine which psycho-social influences contributed significantly and uniquely to the students’ educational outcomes, and thus provide key information for informing future research and intervention.

The study employed a mixed-method research design by collecting quantitative and qualitative data and triangulating the findings across multiple
sources. Data was collected from students, teachers, and parents across urban, rural, and village regions in PNG.

There were a number of key findings apparent in the data. First, the FGQ-PNG, the ISM, the SDQII-S, and the GOALS-S (with some modifications) were found to be valid, reliable, and structurally invariant across gender, grade, and regional groups in PNG. These instruments were therefore found to be psychometrically sound measures for use in PNG. Hence, this study has resulted in the development of a suite of instrumentation with demonstrated psychometric properties in the PNG context and implications for teachers and researchers interested in examining these constructs in similar cultural contexts. The study also identified the profile differences between PNG male and female, primary and secondary, and urban, rural, and village students’ endorsement of future goals, instrumentality, motivation, self-concept, and self-regulation.

Next, key relations between the socio-economic, individual psychological, and achievement and effort outcomes were ascertained, and differences in these relations across gender, grade, and region were also discussed. These results enable a more nuanced understanding of psycho-social profile differences for different PNG groups, and as such serve as useful data to inform intervention targeting such groups and accounting for differences.

A comprehensive model of student academic outcomes was also tested in PNG and the key positive and negative predictors of achievement and effort were identified. The investigation’s findings were interpreted within the context of previous theory and research in relation to future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation.
Recommendations to conceptualise student learning within a more comprehensive model of socio-economic and psychological factors was adopted, allowing for the identification of constructs with the strongest relations to student achievement and effort in PNG. Overall, the factors that were identified as positive predictors of outcomes were success and village-oriented future goals and instrumentality, mastery motivational goal orientations, and domain specific self-concept. These psychological variables were found to positively influence student outcomes in the overall model of student achievement and effort. The negative predictors of student outcomes were authority oriented goals and instrumentality, and performance motivational goal orientations. These constructs were found to be consistently negatively related to PNG students’ achievement and effort outcomes. These results suggest that educators in PNG should attempt to create learning environments that foster the development of the positive predictors of achievement and effort, and discourage the adoption of the negative psychological influences. The study provided suggestions for improved future research in PNG cultural settings and practical advice for increasing the positive and decreasing the negative influences of student outcomes. These results offer a promising platform for informing intervention and offer support for the theory and research on which McInerney’s revised model is based. The study also enriched our understanding of the broader socio-cultural influences underpinning the educational experiences of PNG students including the characteristics of the teacher, the language of instruction, the child-family relationship, and the external socio-cultural environment.
There were a number of strengths and some weaknesses of the current investigation’s research design. The strengths included the mixed-method research design, the investigation of a broad range of socio-economic and psychological variables within a comprehensive model, the rigorous statistical techniques employed to analyse the data, and the adoption of culturally sensitive data collection techniques. The limitations of the study included the use of only one time-wave of data, the lack of investigation of reciprocal effects, the small village sample size, and the potential influence of social desirability in students’ self-report ratings. Future research could attend to the current study’s strengths and weaknesses when investigating further the relations between psycho-social constructs and student academic outcomes in PNG.

To summarise, Chapters 2 and 3 provided a summary of recent literature concerning the state of education in PNG and the background literature underlying McInerney’s revised model of student education. Specifically, a summary of the literature surrounding future goal orientation, perceived instrumental value, motivation, self-concept, and self-regulation was provided. Chapter 4 presented an outline of the aims, hypotheses, and research questions of the current investigation, and a rationale for these was provided in accordance with the literature presented in the previous chapters. Chapter 5 summarised the methodology that was adopted in the current study and discussed the participants, research settings, instrumentation, and statistical analyses that were utilised to analyse the quantitative and qualitative data. Next, Chapters 6 and 7 presented the quantitative results whilst Chapter 8 presented data from students, teachers, and parents that was collected through educational ethnographic methods.
Finally, Chapter 9 discussed the results presented in the previous chapters and highlighted the implications of these findings for theory, future research, and educational interventions within PNG.

As emphasised at the beginning of the investigation, PNG has experienced a history of educational reform characterised by disorganised attempts at improving student learning environments, educational syllabus documents, and achievement of academic and psycho-social (engagement, and motivational) outcomes. Rarely has such a systematic approach been adopted, examining a comprehensive model of student achievement in a manner that is both statistically rigorous and powerful, and culturally appropriate and sensitive. Whilst basing our understanding within the broader external socio-cultural influences of student learning processes, the investigation has provided a number of promising strategies to inform interventions, aimed at altering key internal, psychological processes which are influential in PNG student learning.
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APPENDIXES

Appendix A

School Information Letter

Att: School Principal
To Whom It May Concern,

I am a doctoral student at the University of Western Sydney investigating student achievement in Papua New Guinea. In particular I am looking at what influences student motivation, learning, and achievement. In order to research this I will be required to survey school students (from grades 6 through to 12) in Papua New Guinea schools. Approximately 60 minutes of students’ time is required to complete the questionnaire, and individual results will be kept confidential. Participation in this study is not compulsory.

I was wondering whether you would be willing to allow approximately 4 of your school’s classes to participate in this study. Attached is a copy of the research proposal, a sample questionnaire, and parent consent forms that will be used in this study. I would greatly appreciate it if you would read through the material and inform me of your willingness to participate in my research.

If you have any further questions please don’t hesitate to contact me on 0412869210. This study has the support of the University of Western Sydney and is being supervised by Professor Dennis McInerney.

Kind regards,

Genevieve Nelson
Appendix B

Parent Information Letter

We are interested in researching student achievement at school in Papua New Guinea. The main purpose of this research is to increase our knowledge about the different things that influence how well students do at school. For example, we want to know what motivates students and how they learn. The results may be able to be used to improve education in PNG as we will have a better understanding of what makes students do well at school.

Your child will be required to complete a questionnaire with questions on it asking them about what ‘motivates’ them at school, how they like to learn, how well they think they are doing, their future goals and how much they ‘value’ school. There are no ‘right’ or ‘wrong’ answers – we are not “testing” them! The questionnaire and briefing will take approximately 60 minutes of your child’s time. They may withdraw from the study at any time and will not be disadvantaged if they do not participate. If your child does not participate in the study there will be alternative class work for them to do with their schoolteacher. There are no perceived risks involved.

Participation in this study is voluntary and the results will be kept anonymous. Only grouped data will be published. No individual child will be identified in any report. Once we have completed our research, you are entitled to access our findings and results and a copy of the research thesis will be given to your child’s school principal or made available by request. The results will be stored electronically and on paper at the School of Psychology, UWS, Bankstown for 5 years.

We will need your permission also to obtain your child’s student achievement and attendance records, so we can relate them to their answers on the questionnaires. These records will be anonymous and each child will be identified by a number not by their name. If you have any further questions about your child’s participation, please feel free to contact Genevieve Nelson (chief investigator) on +61 412 869 210 or Professor Dennis McInerney (supervisor) on +61 2 9772 6400 or at d.mcinerney@uws.edu.au. You can also contact Andrew Rose at the Australian High Commission in Port Moresby if you have any queries, Andrew.Rose@dfat.gov.au.

NOTE: This study has been approved by the University of Western Sydney Human Research Ethics Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (tel: 02 4570 1136). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Parent Consent Form

Please read the Information sheet before signing this.

1. I, .........................................................................................., agree for my child, ....................................................., to participate as a subject in the research project described in the subject information statement attached to this form.

2. I acknowledge that I have read the research information statement, which explains why my child has been selected, the aims of the research project and the nature and the possible risks of the investigation, and the statement has been explained to me to my satisfaction.

3. I understand that my child or I can withdraw from the research project at any time without prejudice.

4. I give consent for my child’s academic results and school attendance records to be obtained by the experimenter from my child’s school.

5. I agree that research data gathered from the results of the study may be published, provided that my child cannot be identified.

6. I understand that if I have any questions relating to my child’s participation in this research, I may contact Genevieve Nelson on ph. +61 412 869 210, or Professor Dennis McInerney on ph. +61 2 9772 6400 who will be happy to answer them.

7. I acknowledge receipt of a copy of the Research Information Statement.

Note: This study has been approved by the University of Western Sydney Human Research Ethics Committee. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (tel: +61 2 4570 1136). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Signature of parent: ....................................................

Please PRINT name: ....................................................

Date: ....................................................
Appendix C

Example Translated Information Sheet – Koiari Dialect

Koiawie Hotomoikeko (Kioari Translation: Information Sheet)

Deiaola Vaveve. Sikulu esemu hau malei Papua Niugini Keve


Katehalemo la esemu ba belala Ko hisaive vai isime loui namiheve vadeu dei hadabe kemo sikuluamale keve. Oleve kateai lulele kahova malemo vahoe negate kemo nahie ulie. Keve bae be “huhui dua” ige “huhui toela” anisiai. Ne bae lulele esemu testinevelivebene. Iaemi Komo misoho 60 minit keu la ese taemi. La esehau abu uvu mai sikulumo mavoholige keu Koseanu abula nae sikulu ke valivebene vaveveve. A, ese sitadi ov sikulu ke neniai va holige abula tota Kalasi mole vai to Kemo nentumuai sikuluai ige titiana luvuta haiveve loivai kemo tota bae huhui toela bae ulive bene.

Oleu sikulu komo velemahe heu isivi tata ige au sitadi nieg rekodi ve kena bae ui tai. Ko bae gulupu unahamo abuna bae loui. Ese igaegae kena bae repoti mo bae velemalive bene. Vanimo igaemo he haukava ko hisaihage vesuiheto sikulu ese hau bae ko malei vaveve ke hehovai ba sikulu principal kemo bae dehada
maleve or deu requestiale bae. Sitadis ko vaveve risaltive kena bae ui electronically ige paper mo sikulu of Psychology U.W.S. Bankstown for 5 years (Vagana faiyia sikulu kea una vai).

Mamuvu, Nanuvuha. Titia ne isivihamaleike la emoppermission isime ha hese lulevevesime sikuluho timale vanie record katealemo ne valive hunur abe egelegeleme abu enisa mavonale kemo questioniveti igaetoai. Recordi abe kebiabuna duaveage ese igaegae kehuabuna bae Ivimo bae louhulive bene isito naba unahamo bae abu abu naba helehai. Bema ha huhuimo ha huhui a ese mai sikulu mo lohonige please ne ha namihai ana hehimo ivi komo bae de contact hava free Genevieve Nelson (chief investigator) on +61412869210 or Professor Dennis McInerney (supervisor) on +6197726400 of Andrew Rose at the Australian High Commission in Port Moresby at Andrew.Rose@dfat.gov.au.
Appendix D

Student Questionnaire

Future Goals Questionnaire – Papua New Guinea (FGQ-PNG)

Graduating from high school is important
Attending a university is important
Getting a job is important
Making money is important
Getting into the armed forces or police is important
Supporting my family is important
Making a contribution to my village/community is important
It is important to me to become an important person in my village
It is important to me to become a village elder
It is important to me to become a doctor in my village
It is important to me to leave my village one day
It is important to me find work in Port Moresby one day
It is important to me to help look after my parents and siblings
It is important to me to become a successful person
It is important to me to become a politician
It is important to me to know how to help our village make money

Attending school is important to graduating from high school
Attending school is important to attending a university
Attending school is important to getting a job
Attending school is important to making money
Attending school is important to getting into the armed forces or police
Attending school is important to supporting a family
Attending school is important to making a contribution to society
Attending school is important to become an important person in my village
Attending school is important to become a village elder
Attending school is important to become a doctor in my village
Attending school is important for me to leave my village one day
Attending school is important to find work in Port Moresby one day
Attending school is important to help look after my parents and siblings
Attending school is important to become a successful person
Attending school is important to become a politician
Attending school is important to know how to help our village make money

Getting good grades in school is important to graduating from high school
Getting good grades in school is important to attending a university
Getting good grades in school is important to getting a job
Getting good grades in school is important to making money
Getting good grades in school is important to getting into the armed forces or police
Getting good grades in school is important to supporting a family
Getting good grades in school is important to making a contribution to society
Getting good grades in school is important to become an important person in my village
Getting good grades in school is important to become a village elder
Getting good grades in school is important to become a doctor in my village
Getting good grades in school is important for me to leave my village one day
Getting good grades in school is important to find work in Port Moresby one day
Getting good grades in school is important to help look after my parents and siblings
Getting good grades in school is important to become a successful person
Getting good grades in school is important to become a politician
Getting good grades in school is important to make money

Completing assigned work in school is important to graduating from high school
Completing assigned work in school is important to attending a university
Completing assigned work in school is important to getting a job
Completing assigned work in school is important to making money
Completing assigned work in school is important to getting into the armed forces or police
Completing assigned work in school is important to supporting a family
Completing assigned work in school is important to making a contribution to society
Completing assigned work in school is important to become an important person in my village
Completing assigned work in school is important to become a village elder
Completing assigned work in school is important to become a doctor in my village
Completing assigned work in school is important to leave my village one day
Completing assigned work in school is important to find work in Port Moresby one day
Completing assigned work in school is important to help look after my parents and siblings
Completing assigned work in school is important to become a successful person
Completing assigned work in school is important to become a politician
Completing assigned work in school is important to know how to help our village make money

Inventory of School Motivation (ISM)

Task.

I like being given the chance to do something again to make it better
I try harder with interesting work
I like to see that I am improving in my schoolwork
I need to know that I am getting somewhere with my schoolwork
**Effort.**

When I am improving in my schoolwork I try even harder  
The harder the problem, the harder I try  
I try hard at school because I am interested in my work  
I work hard to try to understand new things at school  
I am always trying to do better in my schoolwork

**Competition.**

Coming first is very important to me  
I work harder if I’m trying to be better than others  
I want to do well at school to be better than my classmates  
I am only happy when I am one of the best in class

**Social Power.**

I work hard at school so that I will be put in charge of a group  
At school I like being in charge of a group  
It is very important for me to be a group leader  
I often try to be the leader of a group

**Affiliation.**

I do my best work at school when I am working with others  
I try to work with friends as much as possible at school  
I prefer to work with other people at school rather than alone

**Social Concern.**

It is very important for students to help each other at school  
I like to help other students do well at school  
I care about other people at school  
I enjoy helping others with their schoolwork even if I don’t do so well myself  
It makes me unhappy if my friends aren’t doing well at school

**Praise.**

Praise from my teachers for my good schoolwork is important to me  
Praise from my friends for good schoolwork is important to me  
At school I work best when I am praised  
I want to be praised for my good schoolwork  
Praise from my parents for good schoolwork is important to me

**Token.**

I work best in class when I can get some kind of reward  
I work hard in class for rewards from the teacher
Getting a reward for my good schoolwork is important to me
Getting merit certificates helps me work harder at school

**Goal Orientation and Learning Strategies Survey (GOALS-S)**

**Elaboration.**

When learning things for school, I try to see how they fit together with other things I already know
When learning things for school, I often try to remember what I learnt in other classes about the same or similar things
I try to understand how the things I learn in school fit together with each other
I try to understand how what I learn in school is related to other things I know
I try to see the similarities and differences between things I am learning for school and things I know already
I try to match what I already know with things I am trying to learn for school

**Organisation.**

I try to organise my school notes when I want to learn things for school
I reorganise my schoolwork so that I can understand it better
I organise what I have to do for school so that I can understand it better
I use summaries to help me organise and learn my schoolwork
When I want to learn things for school, I try to arrange them so that I can understand them better
When I want to learn something for school, I make sure that I am organised

**Rehearsal.**

When I want to learn things for school, I practice repeating them to myself
When I want to learn things for school, I reread my notes
I try to memorize things I want to learn for school
I memorise the things I want to learn for school
I repeat things to myself when learning things for school
I reread my books when I want to learn things for school

**Monitoring.**

I often ask myself questions to see if I understand what I am learning
I try to decide what parts of my schoolwork I don’t know as well as others
I often check to see if I understand what I have read
I often try to decide what parts of my schoolwork I don’t know well
I check to see if I understand the things I am trying to learn
I try to make sure that I understand what I am learning
Planning.
I often look through books to see how they are arranged before I start reading
When I want to learn things for school I pick out the most important parts first
Before trying to learn things for school I try to decide what the most important
parts of what I am trying to learn are
I often plan ahead so that I can do well in my schoolwork
I often try to decide first what are the most important parts of what I have to
learn for school
I try to plan out my schoolwork as best I can

Regulating.
If I don’t understand my schoolwork, I ask the teacher to help me
If I am having trouble learning something at school, I ask for help
When I don’t understand something at school, I try to get someone to help me
If I get confused about something at school, I go back and try to figure it out
If I get confused about something at school, I try to work it out later
If I don’t understand something in school, I go back and try to learn it again

Self-Description Questionnaire II-Short (SDQII-S)

Mathematics.
MATHEMATICS is one of my best subjects
I get good marks in MATHEMATICS
I have always done well in MATHEMATICS
I do badly in tests of MATHEMATICS

English.
I am hopeless in ENGLISH classes
Work in ENGLISH classes is easy for me
ENGLISH is one of my best subjects
I get good marks in ENGLISH
I learn things quickly in ENGLISH classes

General.
I get bad marks in most SCHOOL SUBJECTS
I learn things quickly in most SCHOOL SUBJECTS
I do well in tests in most SCHOOL SUBJECTS
I am good at most SCHOOL SUBJECTS
Appendix E

Open-Ended Qualitative Questions

(a) What would you like to do after you complete primary / high school?
   Why?

(b) What sort of training would help you to achieve what you want to do after
    you complete high school (eg University, apprenticeship, training
    course, none)? Why?

(c) How important is it to you to complete school? Why?

(d) Do you think completing school will help you to get a job? Why/Why not?

(e) How important is it to you to get a job? Why?
Appendix F

The Papua New Guinea Experience

“6… 6:30… 7… 7:30… … 9:30… 10… or maybe not at all!”

(Marcella Amuli, 2006; in response to the question ‘when will our truck arrive to take us to the schools today?’)

‘Papua New Guinea – the land of the unexpected’. A comment that you will hear on every flight travelling into Port Moresby. A comment that people who have visited the land gently snigger under the dinner table when you first tell them you are going to go and visit. A comment that ex-patriots say to you with an eye-brow raised when you mention you are off to do some research there. A comment that locals laugh at you when you first tell them your itinerary outlining your ‘semi-strict’ timetable for your time in PNG. The ‘land of the unexpected’ is the most apt description of a country that I have come to love and adore. It is the reason behind the country’s breathtaking diversity, phenomenal character, and remarkable breadth of experiences. Or perhaps the unexpectedness is the result of these? Either way the culture, the people, the history, and the experiences I have had in PNG have instilled in me a great passion and desire to know more and to one day contribute back.

Included in this appendix is a collection of photographs taken throughout my many trips to the land of the unexpected. Often words do not suffice when describing the people, environment, culture, and diversity of this country. So, the photographs that I have selected, tell in pictures some of the stories behind the experiences I have had in PNG. These photographs capture my seven year journey in PNG and hopefully give you an insight into my love and passion for the country and its people.
First impressions of PNG…

A food market in Port Moresby

Filling up with petrol – just before we ran out!
A remote and poor village on the way to Kokoda

Climbing for coconuts
Trekking the Kokoda Track…

One of many river crossings to come

Radioing for assistance during the wet season
Taking in the spectacular view of Kokoda

The beginning of the Track
Heading through the jungle up to Isurava

School and Education in PNG…

A village classroom
A rural classroom

The Research Experience...

Conducting qualitative interviews
Organising the research program with a teacher

Quantitative research in a village school

Conducting research in the dark – the only way some village students would participate
A curious community involved in the research

My ‘trust’ research assistants

Using pictures for the qualitative parent interviews
Village Life…

Village overlooking Imita ridge

A Koiari dancer

Big load for the kids
A remote village elementary classroom

Rural Life…

Rural school students

A school library
Girls’ dormitory

mmm… Lunch!

School hall
Urban Life…

Port Moresby student

An urban school assembly

City school classroom
My Friends...