THE EFFECTS OF MUSIC AND MOVEMENT
ON MOTHER-INFANT INTERACTIONS

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I hereby declare that this submission is my own work and, to the best of my knowledge, it contains no material previously published or written by another person, nor material which has been accepted for the award of any other degree or diploma at the University of Western Sydney, or any other educational institution, except where due acknowledgment is made in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project’s design and conception is acknowledged.

_________________________
Dedicated to my family

Steve, Alex and Louis, and the Golden Duchess
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ABSTRACT

A music and movement program that incorporated vocal, gestural and rhythmical movement activities was devised with the aim of promoting first-time mothers’ interactions with their infants from the age 2 to 6 months. For first-time mothers as primary caregivers, the early post-partum months of the transition to parenthood can be a stressful period, affecting communicative interactions with their infants and the early development of the dyadic relationship. Furthermore, if mothers are lacking a repertoire of activities that promote communicative interactions via the use of vocal, gestural and rhythmical movement activities the development of the mother-infant relationship may be inhibited.

Considering factors that affect the early development of the mother in her role as primary caregiver and the developing relationship with her infant, the investigation of two studies are reported. Study 1 was aimed at investigating the effects music and movement and face-to-face social contact on the frequency of mothers’ interactions with their infants and maternal well-being. Face-to-face social contact was investigated as a factor (both independent of music and movement, and its interaction effect with music and movement) that could influence mothers’ communicative interactions with their infants and maternal well-being. Study 2 investigated behavioural outcomes within the mother-infant relationship in response to the communicative effects of music and movement as measured by change in the characteristics of mothers’ Infant-Directed Speech and dyadic reciprocity.

Results indicated that up-tempo playsongs and rhymes which incorporated rhythmical movement were preferred by the mothers to engage with their infants. As an effect of the their use of the music and movement activities, mothers’ interactions with their infants increased together with their perceived mother-to-infant attachment, characteristics associated with their Infant-Directed Speech and the dyadic reciprocity. Without music and movement, mothers decreased their music and movement interactions with their infants together with their perceived mother-to-infant attachment, characteristics associated with their Infant-Directed Speech and the dyadic reciprocity. It was concluded that mothers’ use of the music and movement program with their infants in the early post-partum months was a valuable stimulus that can enhance the mother-infant relationship.
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# GLOSSARY OF ABBREVIATIONS

<table>
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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>F2F</td>
<td>Face-to-Face Social Contact</td>
</tr>
<tr>
<td>IDS</td>
<td>Infant-Directed Speech</td>
</tr>
<tr>
<td>M&amp;M</td>
<td>Music and Movement</td>
</tr>
<tr>
<td>M&amp;M-F2F</td>
<td>Music and Movement Face-to-Face Program</td>
</tr>
<tr>
<td>M&amp;M-SI</td>
<td>Music and Movement Self-Instruction Program</td>
</tr>
<tr>
<td>P&amp;C</td>
<td>Play and Chat Program</td>
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THESIS OVERVIEW
This dissertation investigates the effects of a music and movement program designed to enhance the communicative interactions of healthy first-time mothers with infants aged 2-6 months. The rationale for this research was developed from three main questions – (i) why is an intervention program required for non-clinical first-time mothers, (ii) why is mothers’ practice of music and movement activities with their infants important during the early postpartum period, and (iii) does a music and movement program devised to enhance first-time mothers’ communicative interactions with their infants positively affect maternal well-being and the developing mother-infant relationship? The results of two studies will be presented.

From the reviewed literature in Chapter 1 it will be established that the early postpartum months can present challenges to new mothers in their role as primary caregiver. Beyond factors such as social support, maternal mood and infant temperament that could impact any mother’s ability to meet the needs of her infant, anxiety associated with her new role can be a common problem that affects the first-time mother’s capability as the primary caregiver. Furthermore, their lack of knowledge and experience of practicing caregiving skills can impinge on these mothers’ perceived competence. The theory of self-efficacy (Bandura, 1977, 1989, 1997) will be presented as a framework which elucidates the development of maternal competence, in that a mother’s self-efficacy is associated with her performance of caregiving tasks. Evidence will be presented suggesting maternal self-efficacy is an influencing factor on mothers’ general well-being and the development of the mother-child relationship.

Recognising that in general first-time mothers require support and knowledge that will build on their competence as a caregiver, early intervention programs in Australia have been devised and implemented by government funded maternal and infant health care organisations. It will be argued that while the content of these programs is valuable in providing mothers with knowledge and skills to meet the physical needs of their infants through daily routine tasks, concerns are raised that such programs may not be addressing other maternal caregiving qualities that are essential in developing a mother’s joyful, communicative relationship with her infant, which is, in turn, vital for the infant’s emotional and interpersonal development.
In furthering this argument, it will be proposed that many parents may be unaware of their infants’ early capabilities and that intervention programs can build on parents’ knowledge and encouragement of the importance of enjoyable interactions, especially through more ‘hands on’ approaches. Supporting this premise, empirical evidence will be presented on the outcomes of interventions for healthy first-time mothers with newborns. By providing these mothers with knowledge of newborns’ capabilities and developmental characteristics, and encouraging sensitive communicating with their infants, such programs can enhance the development of the mother-infant relationship.

Chapter 2 continues to develop the argument that the role of the mother as the primary caregiver is essential in providing the infant with a sensitive and affectively stimulating social environment that in turn stimulates infants’ desire to communicate. Theories and empirical evidence associated with infants’ developmental needs in the first six months of life will be presented. In particular, the implications of a secure attachment (Bowlby, 1969; Ainsworth, Blehar, Waters & Wall, 1978) and the theory of innate intersubjectivity which accounts for infants’ intrinsic communicative behavioural development (Bråten, 1992; Trevarthen, 2001) are discussed. As part of their communicative development infants’ need for playful interactions from affectionately attentive adults will be emphasised. Mothers and infants engaging in such interactions develop joyful dialogic companionship. Without such interactions the early development of mothers’ and infants’ joyful, communicative relationship could be hindered. This latter point relates back to literature presented in Chapter 1 reinforcing the need for intervention programs to address maternal caregiving qualities that are essential in developing first-time mothers’ affective, communicative relationship with their infants.

Following from this, Chapter 3 discusses the communicative processes that mothers use when interacting with their young infants. Mothers’ employ three modes of communication when interacting with their infants – through the use of their voice, gestures and rhythmical movement. The specific functions and characteristics of these communicative modes will be discussed and evidence will be presented illustrating their effects on infant development. From this evidence it will be further
argued that the first-time mother’s possible lack of knowledge on the importance of enjoyable communicative interactions together with anxiety associated with her new role may be inhibiting her ‘intuitive parenting’ (see below) and thus not creating an optimum nurturing environment. The first-time mother’s developing relationship with her infant could therefore benefit from the practice of music and movement activities that promote the mother’s communicative use of voice, gestures and rhythmical movement.

The role of music as an affective communicative medium is discussed in Chapter 4. In particular how a musical environment created by the mother produces the communicative effects that are thought to be the foundation of the development of a positive mother-infant relationship (Hodges, 1996). In addition to the mothers’ use of music, discussion (and linking to the literature of Chapter 3) will reinforce the need for rhythmical movement to be coordinated with elements of music, as movement and music are thought to be inseparable (Dissanayake, 2000). A problem arises however in that there is no substantial evidence from research that identifies how mothers’ musical practices affect the dyadic relationship and that therefore justifies encouraging mothers’ communicative interactions with their infants using music and movement. This dissertation supports the need for such information.

Developing the basis for this investigation, Chapter 4 presents a rationale for the content of a music and movement program. Drawing together literature on the effects of mothers’ vocal, gestural and rhythmical movement interactions, the use of playsongs and lullabies, rhymes and musical games will be discussed together with a rationale for the use of recorded music to include various genres performed by both instruments and voices. A review of music programs devised for parents and infants is also presented in Chapter 4 along with a summary of the argument that parents’ musical interactions with their infants are intuitive – mother’s musical interactions are part of their innate ability to communicate with their infants. This literature argues that deliberate and planned performances by mothers participating in an intervention program are unlikely to carry the emotional richness of spontaneous performances (Trehub, 2002). While this could be so, in this thesis it is argued that there are factors associated with first-time parenting that can hinder mothers’ spontaneous use of musical activities with their infants.
In relation to the notion of intuitive parenting (Papoušek & Papoušek, 1987, 1995) the argument continues that anxiety associated with first-time mothers’ role in the postpartum months could inhibit their ability to create an enriched caregiving environment using spontaneous musical interactions. Other factors are also considered. A study by Vlismas and Bowes (1999) showed that a sample of Australian middle-class healthy first-time mothers had limited repertoire of musical activities they practiced with their infants reducing the frequency of these types of interactions. Other factors which Mechthild Papoušek (1996) has expressed concern for are lifestyle changes and the over-use of background music for entertainment which has brought about the decline of mothers’ use of singing and dancing with their infants. These factors could therefore be contributing to a diminishing tradition of mothers and infants sharing enjoyable time through the creation of a musically enriched environment that promotes companionship.

Chapter 5 presents Study 1 which investigates if first-time mothers’ encouraged practice of music and movement (M&M) over a 5-week period increases the frequency of communicative interactions with their infants and enhances maternal well-being. Furthermore, mothers’ evaluation of their participation in the program and the implementation methods of the program are investigated. Considering the literature on the theory of self-efficacy (Bandura, 1977, 1989, 1997) and the influence that social support can have on mothers’ caregiving role, the method of implementing the M&M program is considered as a possible confound. Accordingly, face-to-face (F2F) social contact is investigated as an influencing factor on the method of program implementation. To determine the efficacy of the M&M program and the effects of F2F social contact, four groups were formed – two M&M program groups and two No-M&M program groups. The two M&M program groups were – (i) a ‘face-to-face (F2F) social contact’ group whereby mothers and infants meet weekly in a group setting under the facilitation of the researcher, and (ii) a ‘no-F2F contact’ group who were provided a self-instruction format of the M&M program by way of written material and an audio-tape. The two No-M&M groups were – (i) a ‘face-to-face (F2F) social contact’ group whereby mothers and infants met weekly in a group setting under the facilitation of the researcher and were instructed on the use of play (without M&M) activities with their infants, and to provide mothers with the
opportunity to discuss issues relating to mothering, and (ii) a ‘no-F2F social contact’ with no intervention control group.

Chapter 6 discusses and interprets the results of Study 1 according to the predictions set out in Chapter 5 and the reviewed literature in Chapters 1 to 4. Implications for further research are also presented in Chapter 6 which critically reviews Study 1’s self-report method of data collection and demand characteristics associated with the questionnaires as presenting possible bias affecting validity of the results. It is concluded that further research employing more objective measures is necessary to obtain evidence of how the practice of music and rhythmical movement affects first-time mothers and their infants under the age of six months.

Chapter 7 presents a prelude to Study 2 discussing objective measures to assess the effects of the M&M program on mother-infant behaviours. Relevant to the underpinning literature in Chapter 3, it is proposed that changes in mothers’ Infant-Directed Speech (IDS) be examined by measuring characteristics of their attentional, affective, and linguistic functions as well as their Communicative Intent (Burnham, Kitamura & Vollmer-Conna, 2002; Kitamura & Burnham, 2003). The Mother-Infant/Toddler Play scale (Chatoor, Getson & Himmelberg, 1985) is used by raters, blind to participant information and experimental aims, to measure the behavioural effects of M&M on mother-infant interactions.

Chapter 8 presents Study 2 which investigates the effect of M&M on (a) mothers’ behaviour, and (b) mother-infant behavioural interactions, in order to evaluate whether the results of Study 1 are borne out in behavioural measures. Two groups were formed – an M&M group and a No Treatment Control group. Results are reported.

Chapter 9 discusses and interprets the results of the studies in relation to the predictions and the reviewed literature. Accordingly a proposed model of the communicative effects of M&M and No M&M on the mother-infant relationship is presented. This chapter also includes limitations of these studies and provides suggestions for further investigations to build on the results of the thesis. It is concluded that shared music and rhythmical movement activities are a source of
enjoyment and can benefit the mother and infant relationship in the early post-partum months. To ensure that this type of education and resources are available to first-time mothers, it is argued that parenting programs and other educational resources such as CDs and DVDs need to be much more widely available. From this early encouraged practice, it is proposed that parents would continue to explore the use of music and movement with their developing infants. Together, the sharing of such activities could create a musically enriched environment that promotes companionship and regenerates musical practice as part of a developing family’s tradition.
CHAPTER 1

Motherhood: Implications for First-Time Mothers
The foundation for this investigation begins with this chapter’s discussion of the first-time mother and her developing role as a parent. A rationale is formulated as to why healthy first-time mothers and their infants in the early postpartum months could benefit from interventions that assist in encouraging mother-infant communicative interactions.

The transition to parenthood is a time when expectant first-time parents need to make substantial changes to their lives in order to cope with the responsibilities of caring for their first infant. The mother, in her role as primary caregiver in meeting the infant’s developmental needs, can be under strain due to her seemingly overwhelming responsibilities. These responsibilities can appear greater due to ideologies of motherhood and maternal identity related to the societal concept of *good mothering*. Varying degrees of social support and differences in infant characteristics are also determinants that appear to affect mothers’ development of competent caregiving skills. First-time mothers’ competence is required to extend beyond providing physical care for their infants. Infants need responsive and sensitive caregiving from their mother (and their father) to ensure the development of their emotional and social well-being. In identified stressful parenting situations intervention programs can provide mothers with support that can enhance their caregiving practices and relationship with their infant. First-time mothers who are not identified as stressed may also benefit from programs devised to assist their development in their caregiving role during the early postpartum months.

### 1.1 The Transition to Parenthood

The transition to parenthood is a developmental phase where personal, familial and social changes occur in order for the person to adapt to the caregiving role for a newborn infant (Feeney, Alexander, Noller & Hohaus, 2003). New parents are required to adjust the patterns and routines in their lives, and to draw on personal strengths and develop new competencies in order to take on the roles and responsibilities of parenting. Mebert (1991) views the transition to parenthood as a process that for many couples begins prior to the child’s conception. Parents who have planned their pregnancy and have strong ideals about child-rearing roles may have a set of expectations that provides a framework for parenting. Mebert uses the
term ‘assimilation’ to describe the attitude of such parents, as they are likely to have
discussed many of the potentially conflicting issues that arise for new parents. In
contrast, couples that are less prepared for the realities of parenthood may be taken
unaware by the extent of the changes that occur after the child’s birth which will
require mutual decision-making. Yet, whether a pregnancy has been planned or is
unplanned, the transition to parenthood can be a distressing period for both fathers
and mothers.

Much research has investigated factors contributing to the stress associated with the
transition to parenthood (Cowan & Cowan, 1988; Durkin, Morse & Buist, 2001;
Feeney et al., 2003; Matthey, Barnett, Ungerer & Waters, 2000; Morse, Buist &
factors associated with marital and family adaptation. The model integrates the social
and relationship influences with individual psychological influences, recognising the
connection between (1) the characteristics of the individuals in a family, (2) the
marital/partner relationship, (3) the quality of the relationship between the parents
and the child, (4) the relationship of the new mother and father with their own
families, and (5) the balance of each parent’s external sources of stress and social
support.

Recent research has investigated factors associated with marital and family
relationships of first-time parents during the transition period to parenthood. Durkin
et al. (2001) studied 327 Australian couples in the third trimester of pregnancy. Four
factors were extracted from questionnaire data. Results showed that for the men, the
factor of childhood relationship functioning (how the participants perceived their
childhood family relationship with their parents) was not significantly correlated
with either the relationship functioning factor (with their partner) or the
psychological functioning factor (depression, anxiety, anger, negative affect, gender
role stress, and low positive affect). However, the results for the women showed
these three factors to be significantly correlated. This suggests that for men their
childhood family relationships are not as influential in their psychological adjustment
to becoming a parent as they are for women. Also indicated is that childhood family
relationships may not impact upon expectant men’s perceived relationship
functioning as strongly as they do for women. The family and friends social support
factor (related to satisfaction with the practical and emotional support received from family and friends) was significantly correlated with each of the other factors in both the men and women. These findings highlight social support networks as a factor (to be discussed in detail in sections 1.3.1 and 1.3.1.1) that may affect mothers’ and fathers’ transition to parenthood. This study also indicates the transition process may differ for men and women. It appears that men are more susceptible to stress during the pregnancy and women’s stress intensifies after the birth of their first child.

Thus, unlike the first-time father, the first-time mother shows greater symptoms of clinically significant distress or depression from pregnancy into the first postpartum year (Morse et al., 2000; Matthey et al., 2000) which can affect her ability to care for her infant (Field, 1995; Murray & Cooper, 1997). Condon, Boyce and Corkindale (2004) note that studies of depression show a female: male prevalence ratio of between 2:1 and 4:1 which emerges antenatally and carries through to the postnatal period. Clearly, the well-being of the first-time mother during the postpartum period appears be more at risk than the first-time father, and thus may need greater support. The following will discuss the vulnerability of first-time mothers and the difficulties they can face in their new and challenging role.

1.2 The First-Time Mother

In Western culture, the mother is primarily responsible for the care and well-being of the infant during the postpartum year, this contributing to the many challenges of motherhood (Barnard & Martell, 1995). For the first-time mother, the uncertainty as to how she will cope in her role is one of those challenges. Carrying out the constant demands of caregiving tasks can be exhausting for the new mother during her physical recovery after giving birth (Brown & Lumley, 2000; Thompson, Roberts, Currie & Ellwood, 2002). As a consequence, anxiety can be a common problem that affects first-time mothers’ capability as the primary caregiver (Crouch, 2001; Thorpe & Elliot, 1998). Concerns for the infant’s health and certain developmental characteristics such as infant temperament (Cutrona & Troutman, 1986; Ghera, Hane, Malesa & Fox, 2006; Sheinkopf, Lester, LaGasse, Seifer, Bauer, Shankaran, Bada, Poole & Wright, 2006) can also cause distress to the mother and affect her
ability to develop a sensitive caregiving relationship with her infant (Barnard & Martell, 1995; Choi, Henshaw, Baker & Tree, 2005).

Mercer (2004) notes other factors that have been studied extensively and have been shown to impact on the first-time mother’s adjustment to her new role. These factors include socioeconomic status (SES), family relationships and social support and mother’s mental health. Depending on first-time mothers’ ability to cope with such factors, research has found that those who view parenting as stressful at one month postpartum are more distressed, less involved with caregiving, and express fewer affiliative behaviours towards their infants at 12 months postpartum (Levy-Shiff, Dimitrovsky, Shulman & Har-Even, 1998).

Another factor that has been studied is mothers’ notions of their preparedness for the role of primary caregiver. Commonly, the first-time mother feels unprepared for the tasks associated with caring for her infant and for herself in the postpartum period (Choi et al., 2005; George, 2005) and this often results in the mother doubting her parenting ability (Van Egeran, 2003). George (2005) interviewed 21 mothers aged between 18 to 35 years after giving birth to their first child. Results showed that mothers in general felt a lack of preparedness for the early postpartum period. This lack of preparedness was multifaceted and included the mothers needing to change priorities in their lives because of the overwhelming responsibility of motherhood. They also believed that role expectations of being a mother were unclear and they lacked knowledge about caregiving skills. These new mothers’ anxiety was exacerbated by feeling unsupported by the healthcare system.

Choi et al. (2005) interviewed 24 women aged between 27 and 45 years from different socio-economic backgrounds and a variety of occupations, to recall their experiences as first-time mothers some years later. Results predominantly showed the women were initially overwhelmed by their fatigue and lack of skills required to care for their infants. Similar to the results of George (2005), these women believed they were unprepared for their responsibilities. They believed there was a misconception that mothering should come naturally to them and that they should have been able to immediately step into the role of mother and care for the babies without feelings of inadequacy. Choi et al. (2005) argues that these women’s
unrealistic expectations were based on the myths of motherhood that are still dominant in our culture. If this is so, then many first-time mothers may begin their mothering role with false expectations that may impinge on their role as mother and the developing relationship with their infant. The ideologies associated with mothering require discussion in order to understand how the misconceptions of motherhood are formed and the implications they have for the first-time mother.

1.2.1 Ideologies and Theories of Becoming a Mother

*Essential, normal and natural for all women* is what Woollett and Marshall (2001) note as being the western cultural and social representations of motherhood. Integrated into this idealistic representation is the view that motherhood is the essence of women’s adult identity and normal for them to want to be a mother. Mothering should therefore ‘come naturally’ to women and should be their primary source of well-being and emotional satisfaction. Woollett and Nicolson, (1998) suggest that such an ideological view implies that mothering is easy and women should be good at it.

Woollett and Marshall (2001) describe a *good* mother as being selfless and constantly giving of herself for the well-being of the child. The *good* mother provides a child-centred environment, giving the child time and attention, guidance and socialization to ultimately become an independent member of society (Woollett & Marshall, 2001). This approach requires behavioural input from the mother and is driven by an emotional attachment that triggers caregiving behaviours, promoting the survival and well-being of the dependent child (Barnard & Martell, 1995). The feelings expressed by the *good* mother are those of warmth and affection for her child and her child’s needs are put before her own (Woollett & Phoenix, 1996). Woollett and Phoenix (1996) suggest that a mother’s adoration for her child motivates her to facilitate the child’s cognitive development by showing interest in her child. The good mother will talk with her child and model actions e.g. clapping hands suggesting that a task has been ‘well done’. The good mother will also set clear behavioural guidance for the child, all of which facilitates his/her development of competence (Woollett & Phoenix, 1996). Choi et al. (2005) argue that such standards are used for women to measure themselves against, and against which others measure women as being *good* or *bad* mothers.
The ideology of ‘a good mother’ can result in a new mother feeling inadequate in her role, as was found in the study of Choi et al. (2005). Many of the women in this study felt they were inadequate in their caregiving role if they asked for and accepted assistance and support, and did not admit to negative feelings about their lack of pleasure as a mother for fear of being seen as a ‘bad mother’. In addition, the reality of motherhood meant that their lives were changed completely. For many of the women, they struggled because they believed their identity as a mother should have been that of a ‘superwoman’ who should be able to cope with the demands of caring for her infant, carrying out household tasks, and for some women continuing to hold down a job, all while trying to adjust to their new life as a mother.

Theories of maternal role attainment have attempted to account for the stages that women progress through in order to attain an identity of themselves as a mother. The original theory was constructed by Rubin (1967) who suggested the stages begin during pregnancy with women fantasizing about themselves in the role, mimicking the role from observations of other mothers, and seeking information. By the postpartum stage the woman has formed an ideal image of herself as a mother that is reflective of the qualities, attitudes and achievement she views desirable for being a mother. Since Rubin’s (1967) original theory, maternal role attainment has been reviewed with further research from Rubin (1984) and Mercer (1981, 1985) that accounts for maternal variables which influence the process of women attaining a maternal identity. Mercer (1985) suggests that mothers’ sense of harmony, confidence, attitude toward and satisfaction in the maternal role and attachment to her infant are factors associated with the perception of themselves as mothers.

To determine if maternal attitudes towards mothering and confidence differ for multiparous and primiparous mothers, Walker, Crain and Thompson (1986) assessed both primiparous and multiparous mothers at 1 to 3 days post delivery and then 4 to 6 weeks postpartum. Results showed the multiparous group had more positive attitudes toward themselves as mothers than the primiparous group at both times of testing. The multiparous mothers were also more positive toward their infants and were more confident in caring for their infants than the primiparous group. Walker et al. (1986) concluded that for primiparous women, the forming of a new relationship with their babies and gaining self-confidence in the parenting role appear to be
interdependent. In support of such research findings, Barnard and Martell (1995) suggest it is through the process of interactions with the child that a maternal identity is established, as the mother develops a sense of familiarity in the role. The developmental components of forming a maternal identity are both cognitive and affective. The cognitive aspects relate to the physical care and environmental stimulation provided for the child, and the affective components include commitment, empathy and positive attitude that the mother displays (Barnard & Martell, 1995).

From the literature and research into the developmental aspect of a mother forming her maternal identity, Mercer (2004) has advocated for the term maternal role attainment to be replaced with the term becoming a mother, which is concerned with initial transformation and continual growth of the mother identity. Mercer suggests that the original term implies a mother reaches a static state once she has accepted herself as a mother. Instead, motherhood is about a life span approach where the mother is continually developing in her role. She is required to meet the needs of the child, and to adjust to family relationships in which many mothers see themselves as being pivotal in developing a co-parenting relationship (Van Egeran, 2003). These challenges can undermine a mother’s feelings of satisfaction and competence but Mercer (2004) views this as a normal process of becoming a mother and assuming responsibility for her infant and her infant’s future. Thus, Mercer (2004) has attempted to recognise the continual state of development and readjustment that is required in becoming a mother.

What has not been encompassed by Mercer’s (2004) concept of becoming a mother is a clear description of what maternal competence is. It has been previously suggested in this section that in order for a mother to effectively support her infant’s development she needs to provide quality physical care and to express affection (Barnard & Martell, 1995). Maternal competence should then be viewed as the mother’s ability not only to undertake the physical caregiving tasks but also to be responsive and sensitive in her actions to support the infant’s well-being. The following section will discuss the development of maternal competence and how it relates to a mother’s caregiving role.
1.3 Maternal Competence

The theoretical framework of self-efficacy will firstly be presented to provide an understanding of the development of maternal competence with a focus on first-time mothers. Postpartum depression, infant temperament and socio-marital support will be discussed as possible influences on maternal self-efficacy. Leading from this, responsive and sensitive caregiving behaviour will be discussed in terms of the mother’s ability to support the social and emotional well-being of the infant.

1.3.1 The Theoretical Framework of Self-Efficacy and the Development of Mothers’ Perceived Competence

Self-efficacy relates to expectations of personal mastery which pertains to an individual’s judgement about his/her competency to perform a particular task (Bandura, 1977, 1989, 1997). Bandura (1997) suggests self-efficacious individuals are those who judge/perceive themselves as competent and effective at a given task and are more likely to persist at accomplishing successful completion of a task than inefficacious individuals, who tend to give up prematurely. The conceptual framework of self-efficacy developed by Bandura (1977) considers the sources that influence individuals’ cognitive processes and behavioural outcomes that determine their perceived competence. He proposes that personal efficacy is influenced by four sources of information - physiological and mood state, performance accomplishments, vicarious experiences and verbal persuasion.

Figure 1.1 below represents the sources of influence and the modes of induction by which individuals’ self-efficacy is gained. Performance accomplishment is a source of efficacy based on personal mastery whereby repeated success raises task mastery. This source does not exist in isolation, as individuals’ expectations of themselves can derive from observing others perform tasks perceived to be difficult. The vicarious experience persuades the individual that if others can do it they should be able to achieve it to some degree, and with repeated success, personal mastery occurs. Verbal persuasion occurs as people are led to believe they can cope with what may have previously been an overwhelming task to achieve. Yet Bandura (1977) suggests that this source is likely to be weaker than experiences arising from one’s own
accomplishments. *Physiological/emotional arousal* often occurs from stressful situations and affects perceived self-efficacy. Bandura (1977) suggests that people rely partly on their state of physiological arousal in judging their anxiety and vulnerability to stress. Because high arousal can debilitate performance, individuals could be more likely to expect success when they are not feeling overwhelmed by situations that cause stress.

**Efficacy Expectations**

<table>
<thead>
<tr>
<th>Source</th>
<th>Mode of Induction</th>
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<tbody>
<tr>
<td>Performance Accomplishments</td>
<td>Participant Modelling, Performance Desensitisation, Performance Exposure, Self-Instructed Performance</td>
</tr>
<tr>
<td>Vicarious Experience</td>
<td>Live Modelling, Symbolic Modelling</td>
</tr>
<tr>
<td>Verbal Persuasion</td>
<td>Suggestion, Exhortation, Self-Instruction, Interpretive Treatments</td>
</tr>
<tr>
<td>Physiological/Emotional Arousal</td>
<td>Attribution, Relaxation, Biofeedback, Symbolic Desensitisation, Symbolic Exposure</td>
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Figure 1.1 Bandura’s conceptual framework of maternal self-efficacy which identifies the sources of influence and the modes of intervention by which individuals’ self-efficacy is gained. Figure reproduced from Bandura (1977, p. 195).

A mother’s perception of her self-efficacy appears to be associated with her performance of caregiving tasks and may be associated with her general well-being and the development of the mother-child relationship. Teti and Gelfand (1991) suggest that mothers who are efficacious in the parenting role are more likely to establish a sensitive relationship with their infants than those mothers who are lacking self-efficacy. The efficacious mother would persist at a caregiving task in order to gain a feeling of success with task accomplishment and in doing so, feel positive about her role as mother. Performance accomplishment is regarded as the strongest influence on the early attainment of perceived maternal competence. Bandura (1977) notes that early successes associated with task accomplishment raise mastery expectations whereas repeated failures at that particular task lower them. For example, a mother’s success at consoling her infant, and her consistency with this practice, gives rise to her sense of competence. The first-time mother may feel her
sense of competency challenged by her inexperience in caregiving, and the development of her sensitive relationship with her infant could be undermined. A vicarious experience with her infant could assist in improving the mother’s perceived competence. Observing a caregiving task modelled/performed successfully (for example, a technique of massage for relaxing infants) could generate expectations in the mothers that they too can achieve such a task if they intensify their efforts and persuade themselves to carry out the task. Similarly, verbal persuasion could positively influence the first-time mother by encouraging her to believe she can cope successfully with what may appear at first to be an overwhelming task.

The development of self-efficacy from vicarious experiences and verbal persuasion is primarily influenced by the support of various people in the mother’s life. Mothers who may not have the resources of such people could become overwhelmed by anxiety in performing caregiving tasks. According to Bandura (1977), emotional arousal can debilitate performance with the individual conjuring up fear-provoking thoughts about their perceived incompetence and elevating their stress creating a dysphoric maternal mood. As a consequence, avoidance of the task can occur. For a mother to be overwhelmed by her perceived lack of efficacy at performing caregiving tasks could impinge on the well-being of the child and on the positive development of the mother-infant relationship. Recognising that maternal self-efficacy could affect a mother’s performance in the caregiving role, research has attempted to identify certain factors that could interact with mother’s perceived self-efficacy, namely maternal depression, infant temperament and social and marital support.

1.3.1.1 The Effects of Maternal Mood State, Infant Temperament and Social Support on Mothers’ Perceived Self-Efficacy

A study by Olioff and Aboud (1991) examined the possible interaction of perceived maternal self-efficacy and postpartum dysphoria in a sample of 40 married primiparous women. The study employed a longitudinal design to determine whether individual differences in perceived maternal efficacy during pregnancy might have a predisposing effect for postpartum dysphoria. Results show that the influence of maternal self-efficacy on dysphoria began postpartum and could not be attributed to prepartum dysphoria. Olioff and Aboud (1991) note that these results support
Bandura’s (1977) model in that perceived maternal self-efficacy may only begin to influence mood when mothers are required to take up their parenting role and perform specific caregiving tasks. Although not investigated in their study, Olioff and Aboud (1991) suggest that parenting self-efficacy could have a greater negative effect on maternal mood and behaviour if the social support for the mother is not adequate and/or if infant temperament is difficult. These factors could decrease the likelihood of mothers successfully attaining caregiving tasks.

The infant’s temperament in the first few months of life may challenge the first-time mother’s coping resources, increasing the tension of the caregiving situation. Bornstein (1995) notes that mothers are more prone to rate their first-born infants as difficult than infants born subsequently, which may derive from the fact that firstborns simply are more difficult, or, more likely, that first-time mothers are less at ease with their infants and thus tend to perceive them as demanding. Nevertheless, research has revealed that infants’ inconsolable behaviour (as perceived by their mothers) can affect mothers’ perception of their self-efficacy by eliciting feelings of incompetence and insecurity in their role (Cutrona & Troutman, 1986; Teti & Gelfand, 1991). To soothe her infant a mother is required to appropriately read, interpret and respond to her infant’s cues in order to feel successful as a caregiver (Teti, O’Connell & Reiner, 1996). According to Bandura’s (1977, 1989, 1997) theoretical framework it is likely that a mother whose infant is not easily consoled would be less efficacious than a mother whose infant is more responsive to her caregiving efforts. Teti et al. (1996) propose, however, that while infant temperament could well be a factor that affects maternal self-efficacy, a mother who perceives herself to be efficacious is likely to try harder with her efforts to console her difficult baby and use her social resources for assistance to achieve success in her caregiving task. What is uncertain from the Teti et al. (1996) proposal is whether the efficacious mother’s effort to succeed would be as effective in her caregiving tasks if she did not have a social network to call upon for support.

The research of Cutrona and Troutman (1986) on 55 married primiparous and multiparous mothers provides evidence that social support may exert an elevating effect on women’s mood primarily through the mediation of self-efficacy. Although results showed infant temperament to be a dimension of women’s postpartum mood
state, mothers who reported high levels of social support in their pregnancy (with a mean gestational age of 33 weeks) reported higher levels of self-confidence in their parenting role and less depression 3 months postpartum than those with lower levels of support. Cutrona and Troutman (1986) concluded from these results that mothers’ sources of social support are likely to boost maternal self-efficacy and in turn effectively deter depression. What this research fails to acknowledge is that social support from varying sources of people could differ in its effectiveness on the mother’s perceived competence in the caregiving role. Recent research has endeavoured to categorise sources of social support and to identify the effectiveness of significant people in the support network of first-time mothers.

1.3.1.2 Types of Social Support and Their Effect on Maternal Self-Efficacy

Warren (2005) proposed there are four types of social support that mothers seek - (1) instrumental support in providing physical assistance with tasks, (2) informational support in providing information on infants’ physical care of bathing, changing, feeding and sleeping needs, (3) emotional support, and (4) appraisal support affirming the quality of mothers’ care. These categories were investigated by Warren (2005) to determine the role of significant people in first-time mothers’ social support network at 6 weeks postpartum. The sample of women recruited were aged between 18 and 40 years, were from differing SE backgrounds and all were living with the father of their infant. Results showed that from a network of family members, friends and healthcare professionals, it was husbands/partners who provided a high percentage of the instrumental (84%), emotional (85%) and appraisal support (77%) with participants’ mothers and healthcare nurses both providing 77% of the informational support. Further results showed that appraisal and informational support were significantly related to maternal confidence in caregiving tasks.

From Warren’s (2005) research concerns need to be raised for first-time mothers who lack effective support from a husband/partner and mother during this vulnerable period. Single first-time mothers, in particular, have been identified as a group who are vulnerable to stressors when parenting because of the lack of significant support by a husband/partner together with financial strain that can be detrimental to their quality of care they provide for their infant (Mercer, 1995). Compared to a sample of married first-time mothers, Copeland and Harbaugh (2005) found that at 6 to 8
weeks postpartum single first-time mothers experienced more parental distress and perceived their infants to be more difficult to care for.

Regarding marital quality and its association with anxiety and infant temperament on maternal self-efficacy in the early postpartum period, Porter and Hsu (2003) investigated 50 well-educated, middle-class first-time mothers. Results showed that perceived maternal self-efficacy measured at 1 month postpartum was concurrently related to mothers’ anxiety and their marital functioning and satisfaction. Thus, mothers who perceived themselves as efficacious were more likely to be less anxious and to have a supportive marital relationship. By 3 months postpartum however, self-efficacy was no longer significantly related to marital quality or maternal anxiety. Only mothers’ perceptions of infant temperament were found to be negatively correlated with maternal self-efficacy at 3 months postpartum. Although the sample of first-time mothers in this study presented as a low-risk population regarding their transition to motherhood, Porter and Hsu (2003) speculated that the mothers’ experiences of success or failure at routine caregiving tasks by the 3 months postpartum period could be more of a predictor of mothers’ perceived self-efficacy than internal mood states and marital support.

Contrary to the first-time mother’s own mother being an effective source of support is the intergenerational transfer of inappropriate caring practices. It is likely that those who observe less competent and inappropriate caring practices will repeat such practices in caring for their infant (Bandura, 1997). This outcome is similar to that proposed by Gerson’s (1995) family life cycle theory. If new parents’ relationship with their own family is inadequate or negative they may have difficulty in adjusting to their parenting role as an effective caregiver because they have not had satisfactory role models to emulate. Another perspective that Gerson (1995) presents is that new parents who are predisposed to inappropriate family practices of infant care may be influenced to believe it is a ‘best practice of care’ model and ignore information from healthcare professional. As a consequence inadequate caregiving practices are transferred from one generation to another. A study by Kretchmar (2002) has contributed to knowledge of the intergenerational transmission of caregiving skills. First-time mothers who had memories of a positive relationship with their own mother were likely to have a respectful, supportive relationship with
them in their role as grandmother. These first-time mothers in general displayed positive caregiving skills during routine tasks toward their infant at 9 months of age. On the other hand, those first-time mothers who felt rejected by their own mothers during childhood and were not experiencing a close relationship with their mothers as grandmothers, were less competent in their caregiving skills with their infants.

From the evidence of these studies, it appears that first-time mothers’ caregiving competency can be affected by the type of social support that is available to them and its suitability to their caregiving situation. In addition, the previous discussion on good mothering in section 1.2.1 noted that caregiving behaviour of the mother requires input of warmth and sensitivity for the developmental well-being of the infant (Barnard & Martell, 1995). Some women who perceive themselves as bad mothers are unable to attain pleasure from their parenting role as was found in the Choi et al. (2005) study which could result in their inability to provide responsive and sensitive caregiving to their infant. The discussion of mothers’ development in their caregiving role will continue in the following section, outlining the behavioural qualities associated with responsive and sensitive caregiving.

1.3.2 Responsive and Sensitive Caregiving

Regarding responsiveness to an infant’s needs, Winnicott (1965) proposed that the mother as the primary caregiver creates a holding environment. This is done by (1) protecting the infants from physiological harm, (2) paying attention to the infants’ sensory needs, in particular their skin and auditory sensitivity, body temperature, visual sensitivity and their lack of knowledge of existence of anything other than themselves, (3) providing the physical and emotional input that is required to meet the continual developmental needs of the infant, and (4) physically holding the infant, affirming the mother’s love. Through these behavioural interactions and the monitoring of the infant’s reactions, the basic foundation for responsive caregiving is created (Winnicott, 1965).

Winnicott’s psychoanalytic perspective of responsive caregiving incorporates behaviour reflective of mothers’ attachment to their infants. In his early literature Winnicott (1956) maintains that physical and psychological proximity to the child is required for a mother to bond with her infant. During the early postpartum months, a
mother needs to become preoccupied with the responsiveness of her caregiving task to the point of being almost obsessive-like with her thoughts and routine behaviours (Winnicott, 1956). Feldman, Weller, Leckman, Kuin and Eidelman (1999) suggest that the preoccupation and compulsiveness of mothers’ behaviour is unique to the forming of their attachment to the infant and it is the degree of mothers’ attachment that motivates their commitment to the caring of the infant. (Part of the research of this dissertation will investigate the effect that mothers’ encouraged practice of communicative activities has on self-assessed maternal attachment).

Implicit in the description of the holding environment is the importance of maternal sensitivity. Van den Boom (1997) suggests that the notion of maternal sensitivity has stemmed from Bowlby’s theoretical framework of attachment (to be discussed in section 2.1.1 with regard to infant development) and the research of Ainsworth and colleagues. Ainsworth, Blehar, Waters, and Wall (1978) define maternal sensitivity as the capacity of mothers to recognize their infant’s emotional needs, as well as their cognitive and communicative needs, and to respond to them appropriately. Importantly, a sensitive mother is tuned to the subtlety of her infant’s cues. The sensitive mother interacts with her infant in a manner that promotes a flow of social exchanges between herself and the infant (van den Boom, 1997). Mothers who lack sensitivity toward their infants during interactions tend to display intrusive behaviour. Maternal intrusiveness has been described as a mother’s tendency to overstructure, overdirect or over stimulate her infant (Biringen, Emde, Brown, Lowe, Myers & Nelson, 2000). Intrusive behaviour has also been described as including a mother’s low level of contingent responsiveness and inadequate timing in the context of her interactions with the infant (Brighi, 1997). Thus, a sensitive mother’s interactions with her infant need to be both responsive and emotionally giving of herself for the infant’s developmental well-being.

Landry, Smith and Swank (2006) suggest maternal sensitive caregiving is concerned with supporting the infant’s emotional and social needs but argue that in addition mothers need to be both sensitive and responsive to their infants. They advocate that a progression of four dominant behaviours is involved for a mother to provide sensitivity and responsiveness to her infant: contingent responsiveness, emotional-affective support, support for infant foci of attention and language input that supports
developmental needs. Contingent responsiveness of the mother is concerned with her ability to monitor, interpret and respond to the infant’s behaviour in a timely and appropriate manner. Proximity to her infant is a crucial part of contingent responsiveness, which parallels Winnicott’s (1956, 1990) perspective of responsive caregiving and the development of maternal attachment. For example, the mother may need to hold her infant safely and securely and to position herself to have face-to-face contact with the infant (Barnard & Martell, 1995; Van Egeren, Barratt & Roach, 2001). Warm acceptance of infants’ needs and interests are supported by the mother’s display of positive affect through the use of gestures (such as smiling) and the intonation of the language that accompanies it as part of the mother’s communicative interactions with the infant (discussed in detail in sections 3.2 and 3.3). Mothers who support infant foci of attention facilitate an environment that guides and structures interactions, enabling the infant to become a mutual interactive partner in the developing dyadic relationship (discussed in detail in section 2.2). Mothers’ ability to provide such a caregiving environment for their infant can however be affected by the factors of maternal mood, stress and social support.

1.3.2.1 Factors Affecting Mothers’ Sensitivity as Caregivers

The effects of social support, stress and maternal mood on maternal competence have previously been discussed in sections 1.3.1.1 and 1.3.1.2 but research has shown that they also affect mothers’ responsiveness and sensitivity as a caregiver. Maternal depression can cause mothers to display less positive affect expression and less contingent responsiveness with their infants compared to non-depressed mothers (Campbell, Cohn & Meyers, 1995; Cohn, Campbell, Matias & Hopkins, 1990; Murray, Fiori-Cowley, Hooper, & Cooper, 1996; Robb, 1999/2000). Reciprocally, infants appear to mirror the behaviour of their depressed mothers, developing depressed interactions of lower activity levels as early as 3 months of age (Cohn et al., 1990; Murray & Cooper, 1997).

To determine the effects that mothers’ social support networks, stress, mood states and personality could have on their interactions with their infants Goldstein, Diener and Mangelsdorf (1996) studied primiparous women both prenatally and at 3 months postpartum. Self-reporting measures were used to assess mothers’ type, size and satisfaction of social support, to identify stress factors, mood states and differences in
personality. Mothers play and unstructured interactions with their infants in the home setting were rated for sensitivity and expressivity by the first author and two research assistants using Isabella’s (1993) global maternal behaviour scales. Sensitivity was rated according to the degree to which the mother promptly responded to her infant’s behaviour and cues and the degree of her attentiveness and consistency of behaviour. Expressivity was rated by the type of stimulation the mother provided according to the amount of positive affect expressed in her facial expressions, body language and voice.

The results regarding social support showed that the women who had a larger support network prenatally and postpartum were more sensitive toward their infants during interactions. More specific to the type of social support was those who regarded the support from their husbands as effective. They were seen to be more sensitive toward their infant than other mothers reporting dissatisfaction with their spouses’ support. Interestingly, these results differ from the results of Porter and Hsu’s (2003) study of mothers’ perceived self-efficacy and the effects of spousal support at 3 months postpartum (reported previously in section 1.3.1.2). Comparing the results of these two studies it appears that effective spousal support at 3 months may not be associated with mothers’ perception of their competence as a caregiver but appears to play an important role in mothers’ actual display of sensitivity toward their infant.

Further results of the Goldstein et al. (1996) study showed that although the mothers represented a low-risk sample, in general they were experiencing significantly increasing stress per month in the postpartum period than prenatally and that the size of mothers’ social support networks was associated with their stress levels. Mothers with the larger networks had lower stress at 3 month postpartum than mothers with smaller networks. Mothers with larger networks may have a greater opportunity to socially interact with a variety of people and could be more likely to have their emotional needs met than those with a limited network (Goldstein et al., 1996). Results of this study indicate the size of social support networks buffers the effects of stress during the early postpartum months which positively affects the mother’s ability to provide a sensitive caregiving environment for her infant. Although social support was not related to mothers’ expressivity with her infant during interactions, maternal mood and personality were. Mothers who reported more negative moods
and scored higher on Negative Affectivity (negative temperamental characteristics) were less expressive with their infants. Goldstein et al. (1996) suggest that these results are consistent with other research showing an association between negative mood and less expressive maternal behaviour (Field, Sandberg, Garcia, Vega-Lahr, Goldstein, & Guy, 1985).

While factors such as social support, stress and maternal mood appear to affect mothers’ sensitivity and responsiveness to their infants’ needs (Gelfand, Teti, Seiner & Jameson, 1996; Malphurs, Field, Larriere, Pickens, Pelaez-Nogueras, Yando, & Bendell, 1996; Tallandini & Scalembra, 2006), research has shown that caregiving skills and the quality of mother-infant interactions can be enhanced through intervention (Wendland-Carro, Piccinini & Millar, 1999).

1.3.2.2 Promoting First-Time Mothers’ Responsive and Sensitive Caregiving Behaviour: The Role of Intervention

In general, intervention programs concerning mothers’ responsive and sensitive caregiving behaviour in the early post-partum months appear to be designed to assist dysfunction within the dyadic relationship or as a preventative that may arise as a result of associated risk factors. Belsky (1985) however advocates that while the rationale for implementing intervention programs can assist at-risk mother-infant dyads in the development of a healthy relationship, there is equal justification for the implementation of interventions designed to enhance the interactions of low-risk middle class mothers. Programs devised for these mothers heighten parental awareness of infant needs and their own qualities as the primary caregiver resulting in an optimum caregiving environment (Belsky, 1985).

For the first-time mother who in the early postpartum period is adapting to her role and responsibilities as primary caregiver, intervention programs that promote effective parenting can enhance the mother’s caregiving skills and confidence (Gardiner & Deatrick, 2006). In an attempt to overcome the gap in educational and social support that seems to exist for first-time mothers in their early weeks of parenting, programs have been devised and implemented within Australia by government funded maternal and infant health care organisations (Lawson & Callaghan, 1991). These groups were formed in recognition that not only do many
first-time parents lack supportive family and social networks to assist in their transition to parenthood but Australian hospitals’ early discharge policy leaves mothers lacking knowledge and preparedness for their caregiving role. Thus, much information that is presented to non-clinical first-time mothers through these programs appears to be concerned with the caregiving routines associated with the feeding, bathing, changing and sleeping needs of the infant (Warren, 2005). It cannot be denied that this knowledge is vital for mothers’ physical care of their infants, and as discussed in the theory of self-efficacy, mothers’ perception of their early competence in their parenting skills appears to rely on successful accomplishment of caregiving tasks. Concerns could be raised, however, that such programs in Australia may not be addressing other maternal caregiving qualities that are essential in developing mothers’ joyful, communicative relationship with their infant – primarily, the quality of mothers’ communicative interactions with their infants. Perhaps the ideology that mothers are naturally sensitive and responsive to their infants’ cues (discussed in section 1.2.1) is the determining factor as to why these programs concentrate on educating mothers about the physical care of their infants.

Tomlin and Viehweg (2003) note that for an enjoyable communicative relationship with infants to be fostered, parents need to be aware of and respond to their infants’ early social cues such as smiles, eye contact and reaching movements. However, they believe that many parents are unaware of their infants’ early capabilities and that intervention programs can build on parents’ knowledge and encouragement of the importance of enjoyable interactions. Supporting this premise, empirical evidence shows that presenting first-time mothers with knowledge of their newborns’ capabilities and developmental characteristics is advantageous to mothers’ responsiveness as a caregiver and infant developmental outcomes.

Evidence on the effectiveness of providing first-time mothers with information on their developing infants has been shown in a study by Anderson and Sawin (1983). They investigated the effects of presenting information and familiarising thirty first-time mothers with the capabilities and individual characteristics of their healthy newborn infants who were born full-term. Three groups of mothers were formed prior to pretest. During infants’ feeding at 2 days old, mother-infant interactions were assessed using the AMIS scale (Assessment of Mother-Infant Sensitivity) (Price,
1983). After the pretest condition, Group 1 (Demonstration and Explanation) observed a qualified administrator examining their 2 day old infants’ stimulated responses using Brazelton Neonatal Behavior Assessment Scale (BNBAS, Brazelton, 1973). These mothers were then given an explanation about the infants’ developmental characteristics assessed by the scale and the procedure for administering the scale and infants’ performance. Group 2 (Explanation Only) did not observe the BNBAS being administered but were informed by the qualified administrator about the scale, the procedure for administering it and infants’ performance. Group 3 (Control) who were unaware that the BNBAS was performed, did not receive any information about the scale. Instead they received information from a consumers report about safety and durability of items such as stroller, cribs and car seats. Post-test was carried out at 10-12 days of infants’ age, again assessing mother-infant interactions during feeding. Results showed that although Group 1 (Demonstration and Explanation) and Group 2 (Explanation Only) were both more responsive to their infants than the control group, it was only Group 1’s results that were significant. However, the infants of both Group 1 and Group 2 showed greater gains in their alertness, positive affect and mood and visual responsiveness to their mothers compared to the control group. Anderson and Sawin (1983) concluded that assisting first-time mothers in knowing the developmental capabilities of their infants at such a young age gave them insight into how they can elicit appropriate responsiveness that in turn satisfies their infants’ needs.

However, simply providing knowledge may not be enough. Wendland-Carro et al. (1999) believe a compelling case can be made for the proactive use of intervention for healthy first-time mothers of newborns. Based on the notion that these mothers are inexperienced in their ability to parent their infants, they investigated the efficacy of an intervention designed to enhance the quality of mother-infant interactions. Two to three days after giving birth and before leaving hospital, a sample of healthy first-time mothers of full-term infants were instructed in a group situation. For one hour, information was provided by way of a video and a group facilitator. The experimental group was instructed on the newborn’s social competence to interact, affectionate handling of the infant was promoted and mothers were encouraged to communicate during interactions. Compared to the control group who were provided with information about basic caregiving skills such as infants’ feeding and sleeping
routines and hygiene needs, results showed that at the infant age of 1 month the experimental group’s mothers and infants were more synchronous with their interactions. In particular the experimental group showed greater occurrences of reciprocal mother-infant vocalisation and smiling, and mothers’ soothing and stimulating interactions compared to the control group.

Acknowledging the role that intervention plays in developing parenting skills of first-time mothers and the effect it has on the developing mother-infant relationship, Hoffman (2004) advocates that much of a program’s success is determined by the implementation method. In particular, he suggests that programs implemented in a group setting with other first-time mothers and a supportive facilitator can develop a sense of family and community among the participants. Beyond being provided with ‘best practice’ parenting information that assists mothers in creating a nurturing caregiving environment, Hoffman (2004) suggests that mothers coming together as a group can dissolve feelings of loneliness and isolation in their role that can affect maternal well-being. The bond that forms among new mothers as they share their parenting experiences can in itself be a powerful source of guidance that empowers them to feel competent in parenting their infants (Hoffman, 2004). In terms of Bandura’s (1977, 1989, 1997) theory of maternal self-efficacy discussed in section 1.3.1 Hoffman’s proposal for the facilitation of group implemented early intervention reinforces the influence that social contact can have on new mothers’ parenting competence.

From the evidence presented in this section on the effects that intervention programs can have on the healthy first-time mother and her infant in the postpartum period, it appears that specific knowledge relevant to the infant’s needs for responsive and sensitive communicative interactions can enhance the development of the dyadic relationship. However, while the content of the program represents part of the framework that can enhance the mother’s communicative caregiving qualities, methods of implementation appear to be of equal importance. Such evidence and discussion gives strength to the rationale for investigating the communicative effects of a music and movement program devised to enhance healthy first-time mothers’ communicative interactions with their infants. Furthermore, methods of instruction will also need to be investigated as part of the program presentation which could
determine ‘best-practice’ outcomes for first-time mothers’ developing relationship with their infants.

1.4 Summary
The discussion of this chapter has focused on the development of the first-time mother in her role as primary caregiver. The transition to motherhood has been presented as a challenging period that requires lifestyle and family changes in order to adjust to becoming a mother. The ideology that mothering comes naturally has been discussed as a social construct that can set unrealistic expectations on the first-time mothers’ perspective of their role, causing them stress. First-time mothers are required to practice skills that involve not only successfully satisfying the infant’s physical needs through routine tasks but also to display responsive and sensitive caregiving for the well-being of the child. For some of these mothers, factors such as their own mood state, infant temperament, life stress and social support influence their development of maternal competence which can affect their developing caregiving skills. Furthermore, first-time mothers’ limited knowledge and inexperience of practicing caregiving skills may impinge on their ability to provide an optimum environment that nurtures the developing infant and dyadic relationship.

Research on types of interventions in the early postpartum period have provided evidence that healthy first-time mothers’ caregiving qualities that assist them in developing a sensitive, interactive relationship with their infant can be enhanced. As a result the quality of the mother-infant relationship is also likely to be enhanced. Implementation methods of intervention programs were also discussed as an influencing factor on mother-infant outcomes. In particular a supportive facilitator within a group setting was advocated as an implementation method that could positively impact on first-time mothers’ well-being and their parenting practices.

However, evidence was also presented that in Australia, intervention programs for many first-time mothers may be ignoring the role that mothers’ joyful, communicative interactions play in the developing relationship with their infants. With the lack of educating these mothers on the importance of such interactions the investigation of this dissertation will present evidence on both the effects of a music
and movement program devised to enhance mothers’ communicative interactions with their infants from two to six months of age and outcomes of program implementation methods.

The following chapters will draw upon evidence that emphasises the need for mothers’ communicative interactions with their infants and the modes of communication that convey expressions of affect, and role of music and movement. Leading into this discussion, Chapter 2 focuses on infants’ communicative behaviours during the first six months of life and the importance of mothers sensitively facilitating this development.
CHAPTER 2

Infants’ Developmental Needs in the First Six Months of Life
This chapter presents theories and empirical evidence associated with infants’ developmental needs in the first six months of life. In particular, the role of the mother as the primary caregiver will be highlighted as essential in providing the infant with a sensitive and affectively stimulating social environment that in turn stimulates infants’ desire to communicate. The companionship that develops from the communicative interactions of the mother and infant will be discussed, emphasising infants’ need for playfulness. Risk factors affecting the developing partnership will highlight the importance of the mother’s affective communicative interactions with her infant in the early postpartum months.

2.1 Infants’ Communicative Development in a Responsive and Sensitive Caregiving Environment

Drawing from decades of research that has contributed to knowledge of infants’ development, Kopp and Neufeld (2003) suggest that findings incontrovertibly have shown that infants begin life with finely tuned emotional behaviour that enables them to signal their need for nurturance and soothing. Although physically and neurologically immature, infants are born ready to participate in a communicative social system through visual contact, vocalisation (both distressed and non-distressed) (Van Egeren & Barratt, 2004) and gestural body movements (Trevarthen, 1993, 2001, 2005). What has also been established is that infants’ emotional development cannot be dissociated from the other developmental domains of social, cognitive and motor functioning and that infants’ development is bound to the relationships initiated and maintained by the primary caregiver (Kopp & Neufeld, 2003). Infants’ well-being depends on the communicative ability of the mother as the primary caregiver (Trevarthen & Aitken, 2001). It is during the first six months that mothers’ caregiving is at its most intense, and is thought to exert the greatest influence on infants’ development (Bornstein, 1995).

The theories of attachment and intersubjectivity acknowledge the powerful innate motivation of infants to seek emotional interactions with the mother and how the environment which the mother creates determines infants’ developmental well-being. These two theories will be discussed in turn.
2.1.1 The Implications of a Secure Attachment

Bowlby (1969) proposed that the survival of humans is best ensured when proximity to an attachment figure is maintained. Predominantly, the attachment figure for an infant is the mother because of her role as primary caregiver. Infant signalling attracts the responsive mother into close proximity. The mother’s consistent contingency and sensitive responses to the infant’s signals during the first 2 years of the infant’s life form a secure base. The development of a secure attachment enables the infant to assert exploratory behaviour. Bowlby proposed that 3 phases are involved in the development of infants’ secure attachment within the first 2 years: undiscriminating social responsiveness (0-3 months), preferential social responsiveness (3-6 months), and emergence of secure-based behaviour (6-24 months). The phase of goal corrected partnership (where the child acquires insight into the attachment figure’s feelings and motives) occurs from 24-30+ months.

Contributing to Bowlby’s theoretical framework of attachment, Ainsworth (1973) advocated that the qualities associated with maternal sensitivity were salient to the development of infants’ secure attachment. Ainsworth (1973) proposed that an infant acquires a sense of security from the consistent warmth and sensitivity the mother displays during the countless interactions they have together during the first year of life. These interactions ensure the infants’ protection within a nurturing environment, and in times of stress the infant seeks the mother as a source of comfort (Barnard & Martell, 1995; Beckwith, 1990).

The study by Ainsworth, Blehar, Waters and Wall (1978) of 26 mother-infant dyads was the first to examine maternal sensitive responsiveness as a factor that fostered infants’ secure attachment during the first year of development. In an attempt to further characterise the development of infant-mother secure attachment, Isabella and Belsky (1991) studied interactional synchrony of primiparous mothers and infants of 3 and 9 months of age in an attempt to support the hypothesis that secure attachment relationships were characterised by sensitive synchronous behavioural dyadic exchanges. Results showed that infants who were observed to interact in a synchronous, mutually rewarding manner with their mothers were likely to develop a secure attachment relationship whereas infants whose mothers were minimally involved with them during interactions, unresponsive to their signals or were
intrusive and overstimulating were likely to develop an insecure attachment relationship.

There has, however, been varying evidence in support of the notion that maternal sensitivity influences infant attachment in the first year. One study clearly found that maternal sensitivity examined at the infant’s age of 6, 9 and 12 months had no significant relation to their attachment at 12 months (Seifer, Schiller, Sameroff, Resnick & Riordan, 1996). In an attempt to resolve the discrepancy of research results since the pioneering study of Ainsworth et al. (1978), de Wolff and van IJzendoorn (1997) carried out a meta-analysis of 66 studies to determine if maternal sensitivity was indeed associated with infant attachment security. It was concluded that although the effect size of the results of Ainsworth et al. (1978) could not be replicated in any of the studies, maternal sensitivity appeared to be an important factor associated with infants’ secure attachment.

McElwain and Booth-LaForce (2006) suggest that the development of infants’ attachment relationship is influenced by the behavioural patterns of both the mother and her infant. They investigated the effects of maternal sensitivity toward infants’ distressed and non-distressed behaviour at 6 and 15 months of age. Results indicated that greater maternal sensitivity to distress at 6 months was associated with an increased likelihood of a secure infant-mother attachment. These results were not replicated at the 15 month assessment time. At neither assessment period did maternal sensitivity to non-distressed behaviour significantly contribute to attachment security. McElwain and Booth-LaForce (2006) concluded that these results provide partial support for the hypothesis that maternal sensitivity toward infant distress is central to promoting attachment security in the first six months of life. However, the authors emphasised that these results did not indicate that maternal sensitivity to infant non-distress behaviour is inconsequential for infant development.

Mothers’ warmth and sensitivity toward their infants in the first six months are thought to be key factors directly associated with infants’ display of affective expression, (Brazelton, Koslowski & Main, 1974; Stern, 1977) and cognitive functioning (Bornstein & Tamis-LeMonda, 1997). To determine if maternal sensitivity behaviour was correlated to infant cognition and social and emotional
behaviour at 3 and 12 months, Kivijärvi, Voeten, Niemelä, Räihä, Lertola and Piha (2001) investigated low-risk mother-infant dyads. Results showed that infants’ behavioural display of happiness, lack of temperamental distress, social and play behaviour, and the amount of visual contact were all significantly and positively related to maternal sensitivity behavior both at 3 months and 12 months of age. Infant’s alertness/interest and activity level were related to maternal sensitivity behavior at 3 months but not at 12 months of age which may be indicative of infants’ developmental shift in the later half of their first year. Infants begin to acknowledge the world around them in the first half of their first year but it is in the second half of the year that they increasingly direct their attention toward the environment, transferring the focus from their mothers to other forms of stimuli (Bornstein, Maital & Tal, 1997; Lyons-Ruth & Zeanah, 1993). This developmental change, however, appears to occur only if infants have been nurtured with sensitive nonintrusive maternal behaviour that has fostered their autonomy in the early postpartum stage (Biringen & Robinson, 1991).

Biringen and Robinson (1991) conceptualise maternal nonintrusiveness as the degree to which the mother asserts herself during interactions with the child or the degree to which she follows the child’s lead when he/she is initiating exploratory behaviour. Importantly, mothers’ sensitivity associated with nonintrusiveness supports the infant’s effort in gaining autonomy and a sense of individuality. Similarly, Trevarthen (2005) suggests infants’ sense of individuality and development of happiness is a result of mothers’ sensitive support and it is this support that nurtures infants’ inherent ability to interact with their social environment as explained in the theory of infant intersubjectivity.

2.1.2 The Theory of Intersubjectivity: Infants’ Intrinsic Communicative Behaviour

The theory of innate intersubjectivity implies that the infant is born with a biological and neuropsychological awareness that enables their receptivity to subjective states in other persons (Bråten, 1992; Trevarthen, 2001). Bråten argues that the prerequisite for intersubjectivity is the intrinsically dyadic organization of the individual subject. According to Bråten, the central nervous system of the newborn is encoded to acknowledge the immediate co-presence of a complementary companion (or ‘virtual
other’ as Bråten terms it) and it is the responses of the adult companion that are central to infants’ emotional development. Consequently, as the primary caregiver, it is the mother who becomes the infant’s required companion. Similarly, Trevarthen (1993, 2001) argues that in the early developmental period of the first year, which he terms primary intersubjectivity, infants’ intrinsic intersubjectivity motivates them to negotiate social exchanges with others that ultimately determine the path for their cultural learning. Through these negotiated experiences, infants learn about the body and world of objects but are dependent on the quality and the quantity of the input that is provided by adults.

Bråten and Trevarthen’s notion of young infants’ capacity to acknowledge and share interpersonal relationships has been criticised. In particular, Lewis’ (1987) cognitive theory of emotional development acknowledges that there is a group of seven basic emotions that develop within the first 6 to 8 months of life. These are interest, joy, disgust, sadness, anger, surprise and fear. However, he advocates that young infants cannot engage in interpersonal relationships as they are not capable of distinguishing between self and other until they have developed objective self-awareness. As a consequence they are not capable of experiencing or consciously perceiving their own emotions and sharing the emotions of others at a very young age. Trevarthen (1993) on the other hand, argues that young infants’ responsiveness to adults’ interactions, particularly mothers’ affective interactions, shows that young infants do experience shared emotions of the self and others. Trevarthen (2001) proposes that the reciprocity of affectionate emotions shared between mother and infant creates companionship. It is companionship that fulfils interpersonal communicative needs and is therefore crucial to survival of the mother-infant partnership (Bråten, 1992). Due to weight of the evidence, the author takes the view that young infants are indeed capable of interpersonal relationships and affective interaction.

Infants’ need for joyful dialogic companionship from affectionately attentive adults has been shown to be evident in infants’ actions of imitation. To engage the interest and affection of their mothers as primary caregivers, infants use their gaze, facial and vocal expressions, gestures and bodily movements to match those of their mother, these occurring in co-produced rhythmical cycles (Malloch, 1999). By the age of 2 months, infants’ physiological maturation enables them to display greater sensory
alertness to their environment. Visual focusing on the mouth and eyes of the mother are accompanied by coordinated movements of the infant’s face, hands and vocal system that appear to occur in measured and predictable patterns. Trevarthen (1993) describes this as the infant and mother sympathising with one another’s motive states. It is thought that the infants’ mirror responses of emotional expressiveness are internally generated motives that affirm their need for social interactions (Trevarthen, 2001). Yet this imitation of actions does not only refer to infants’ replication of movements demonstrated by the interacting adult, but serves as an interpersonal function for the infant’s well-being (Trevarthen & Aitken, 2001).

*Protoconversations* is a term (originating from the pioneering research of Mary Catherine Bateson, 1975) that has been used to describe infants’ communicative interactions in the first few months of development (Trevarthen, 2001, 2005; Trevarthen & Aitken, 2001). By 6 weeks of age, infants can express concentrated interest in communicating with their mothers that encourages comprehensive and mutual engagement of the dyad. Infants visually focus on their mother’s face and coordinate hand gestures and movements of their arms and head. A smile or certain subtle movements of the lips can indicate infant pleasure. Alert and sensitive mothers will respond, reciprocating the emotions through mirrored or complementary gestures. By 2 months, an infant can predict the timing and emotion of the mother’s expressions in communication (Trevarthen, 1993).

Confirming much of Trevarthen’s descriptive writing of infants’ early communicative development is the study by Lavelli and Fogel (2002). They investigated healthy infants’ face-to-face communication with their primiparous mothers between 1 and 14 weeks of age. Interactions of the infant and mother were characterised by mutual gaze and/or facial actions, vocalizations, and gestures under two naturalistic conditions: with the infant in the mother’s arms and with the infant semi-reclined on a sofa. Weekly video recordings of 3 minutes for each condition were coded according to the type of mother-infant interactions. Results showed a significant increase in infants’ communicative characteristics in face-to-face interactions between Week 4 and Week 9. In particular, a major developmental change in the duration of mother–infant face-to-face communication occurred between the first and second months. Lavelli and Fogel (2002) suggest the significant
increase in face-to-face communication could have been due to infants’ initial increase of gazing at their mothers’ face which in turn sustained the mothers’ gaze. By the second month the infants were actively engaged in coordinating facial and vocal actions oriented to the mother’s face, with most mothers reciprocating with smiles and vocalisations. Results pertaining to infants’ communicative behaviour in the two interaction conditions showed no significant differences during the first month. By the second month however, and even more so into the third month, infants were more responsive in the ‘not-being held’ condition compared to the ‘being-held’ condition. The former condition appeared to provide the infants with enjoyment of the freedom of moving their limbs, together with greater focus on the mothers’ communicative exchanges. (These results regarding the positioning of the infant will provide partial justification for the procedure of positioning the infant for playful interactions with their mothers in Study 2 of this dissertation, section 8.5.3).

Interestingly, sex differences were found during the third month with the two conditions. The girls spent a significantly longer time engaged in face-to-face communication in the ‘being-held’ condition than the boys. Lavelli and Fogel (2002) argue the physical hold and the tactile contact while in the mother’s arms may have soothed many infants. Another factor to be considered regarding the results of infants’ increased enjoyment of interactions in the not-being held condition is that during the third month of development infants assert their desire for playfulness (Trevarthen, 1993, 2001).

Infants have expectations of the emotional quality of the engagement of a sympathetic adult. When their expectations for a happy, playful encounter are not met, infants become distressed. Murray and Trevarthen (1985) studied the effects of perturbed maternal behaviour on infants 6- to 12- weeks of age during face-to-face interactions. Mothers’ engagement with their infant was interrupted by looking away and speaking to the researcher, during which infants remained quiet and maintained interest in the mother. Mothers’ blank-face expression, as well as the more subtle non-contingent condition of video-replay of the mother, induced infant distress, protest and withdrawal from the mother, which the authors argued showed infants’ sensitivity to the unexpected lack of emotional exchanges from the mother. Furthermore, research on infants of depressed mothers reveals the quality of their communication in the face-to-face interactions appears to be highly correlated with
that of the mother (Murray, 1998). Depressed mothers’ communicative interactions tend to be less sensitive toward their infants, more self-focused, and express fewer affirmations of their infants’ behaviour and more negations compared to non-depressed mothers. These unsympathetic and inappropriately timed responses of depressed mothers cause the infants to become distressed and avoidant (Field, Healy, Goldstein & Guthertz, 1990). The frequent exposure to the depressed mother’s dysfunctional behaviour causes the infant to develop dysfunctional interactions with their mother (Field, 1995). The evidence from such research points to the vulnerability of young infants and the effect that mothers’ quality of interactions has on their communicative behaviour and emotional development.

From 3 months of age, Trevarthen (1993, 2001) maintains that infants’ intrinsic motivation for social interaction and playfulness stimulates their desire to partner the mother in games associated with nonsense rhymes, playsongs that involve knee jogging, hand-clapping, and tickling and peekaboo. To emotionally and socially satisfy infants’ developmental needs and to consolidate the companionship of the dyad, mothers are required to participate as play partners by providing infants with a repertoire of activities that stimulate pleasurable interactions. Trevarthen and Aitken (2001) suggest that play is more lively and more satisfying for the infant when their partner does not interact with “mechanical” styled contingency, but rather with varied expressions such as surprise, joy and teasing actions. Stern (1985) highlights the elements of surprise and suspense in mother-infant game playing as necessary if both partners are to sustain their engagement. Accordingly, the mother adds variations in her actions and vocal intonation during games such as tummy tickling which maintains the suspense of the moment for the infant. Trevarthen (2001) argues that it is the anticipation of actions from infant to partner and partner to infant that sustains communicative interest.

Playful teasing of mother and infant contains elements of anticipatory behaviour and is evident in their repertoire of interactions from approximately 3 month of age (Trevarthen & Aitken, 2001). Mothers’ teasing actions are suspenseful for the infant and stimulate infants’ expressions of laughter and joy and these pleasurable interactions sustain the mutual interest and companionship of the dyad (Nakano, 1996). Nakano (1996) suggests that as counterpart to their mothers’ teasing, infants
themselves display teasing behaviours through their grimaces and vocal outbursts. The repetition of mothers’ playful teasing actions and infants’ reactions reflects the intimacy between mother and infant. Trevarthen (2001) describes this as the partners sympathising with each other, where the expressions of pleasure are transferred between mother and infant.

By the fourth month and into their fifth month of development, infants are gaining alertness and interest for their social and emotional environment. Depending on the mother’s communicative ability to engage her infant and the infant’s interest in the mother’s actions, the infant of this age can direct his/her attention more toward the environment than to the mother (Bornstein, Maital & Tall, 1997). Infants’ capability of avoiding adults’ face-to-face interaction is believed to act as a self-protective behaviour for their well-being (Trevarthen & Aitken, 2001). Further contributing to our understanding of infant interest in adults are the findings of a study carried out by Montague and Walker-Andrews (2001) of 4-month old infants. They investigated infants’ sensitivity and reactions to facial expressions of sadness, fear, anger and happiness presented by an unfamiliar adult in the context of peek-a-boo games. Infants were assigned to one of the four emotional expression groups. All infants first received happy/surprised peek-a-boo trials and then were exposed to further trials of the emotion targeted for their group. Results showed that the infants of the happy (no change) condition displayed a decrease in their interest/surprised reaction and were reduced to a neutral expression, showing little or no interest in the adult. The infants of the sad, angry and fear conditions tended to maintain or increase their expressions of interest/surprise. Montague and Walker-Andrews (2001) suggest that these latter emotional conditions are likely to have caused higher arousal because of infants’ ability to detect these expressions as being potentially detrimental to their well-being, whereas the constant exposure to the happy condition increased infants’ familiarity producing less interested reaction from the infants. Another consideration is that infants in this study were subjected to the expressions of an unknown adult which may have caused different results compared to infants observing the expressions of their mothers. As Trevarthen and Aitken (2001) note, by 4 months of age infants’ responsiveness to adults’ expressions vary according to the familiarity of the interacting adult.
At 6 months of age infants have the desire to explore their environment and delight in engaging an audience of familiar people. Trevarthen (2001) describes this as infants being ‘clever clowns’. They display intense pleasure from ‘showing off’ their ability to imitate others (e.g. hand clapping) and create their own repertoire of playful behaviour that is accompanied by diverse vocal cheerfulness which can range from producing a deep guttural gurgle to ‘blowing raspberries’. Together, infants’ gestural and vocal communications by 6 months are indicating their competence as social beings (M. Papoušek, 1996). In particular, infants’ vocal development and how it is integral to their social and emotional world has been studied by Mechthild and Hanuš Papoušek, and from their years of research have provided a model of the stages that characterise this development.

2.1.2.1 Infants’ Vocal Development

Infants’ non-distressed vocal communication is part of their sociable communication and provides a channel for emotional expression. Mechthild Papoušek (1996) likens the infants’ vocal tract to a powerful musical instrument that communicates their social competence. Six stages of development are involved: phonation (0-1 months); melodic modulation and primitive articulation in cooing (2-3 months); exploratory vocal play (4-6 months); repetitive babbling (7-11 months); variegated babbling and early words (9-13 months) and one-word stage (12-18 months). Infants less than 6 months of age expand their vocal repertoire from the cooing stage when they become capable of producing prolonged euphonic sounds (H. Papoušek, 1996). Through playful discovery, they become capable of sounds that can range in pitch across two octaves such as a high pitched shrill/squeal to a low pitched growl, and varying in dynamics from a whisper to a scream (M. Papoušek, 1996). Rhythmic variation to these vocal sounds is created by what M. Papoušek describes as brief staccato-like noises, in contrast to drawn out vowel-like sounds. The infants’ discovery of their vocal dexterity is thought to be motivated by their own amusement and joy with their exploratory behaviour and need for social communication (M. Papoušek, 1996). This development is determined by the support of their mothers as the primary communicative partner in the dyadic relationship (M. Papoušek, 1992).

Papoušek and Papoušek (1987, 1995) propose that mothers are communicatively intuitive. This proposal stems from the argument that special supportive
predispositions coevolved in human caregivers allowing them to guide infants towards speech acquisition and cultural integration (Falk, 2004; Papoušek & Papoušek 1987, 1995; Papoušek & von Hofacker, 1995). As a consequence, mothers’ vocal interactions with their pre-verbal infants are intrinsically adjusted by the mother (discussed in detail in section 3.2) according to the infant’s cues and thus are continually being adapted to meet the infants’ developmental phases of vocal communication. According to Papoušek and Bornstein (1992), this intuitiveness also acts as a didactic function during mothers’ communicative interactions with their infants. They argue that mothers who engage infants in playful applications of vocal matching affectively reward successful matching with expressive vocal and gestural feedback (discussed in detail in section 3.3).

Malloch (1999) studied the vocal matching of a happy mother-infant dyad and found that the infant, who was 4 months of age, entered into a musical game with the mother while the mother was singing a nursery rhyme. The infant vocalised, mirroring the mother’s vocal rhythmic patterns, but, in addition, the infant contributed musically to the duet through improvised vocalisations on the beat. Malloch suggested that this performance by the infant held the mother’s interest and enjoyment, and together companionable dyadic interactions were created from the musical experience. Malloch (1999) noted that the infant’s initial reaction of excitement to the mother’s recital showed she was familiar with the rhyme. What these results may reflect is the infant’s performance was the result of continual exposure to the mother’s expressive musical interactions, scaffolding the infant’s development to the point of her being able to participate as a reciprocal musical partner. It may be that infants who are not exposed to mothers’ playful and consistent vocal interactions may not react with such responsiveness. Also, the infant’s age may have been a factor contributing to the results. Research suggests that infant synchronous vocalisations during mutual coordination of face-to-face communicative interactions with their mothers peak at 4 months of age (Hsu & Fogel, 2001). However, importantly (and relevant to the research of this dissertation), what Malloch’s study shows is that the mother’s expressive vocal input was the stimulus for the playful exchanges through which emotions of joy were conveyed and companionship was formed.
To further understand the development of infants’ non-distressed vocalisation and the role of the mother, Hsu and Fogel (2001) studied the development of thirteen healthy infants from 4 weeks through to 24 weeks of age during face-to-face interactions with their mothers. Five types of mother-infant communication patterns were identified that ranged from symmetrical communication (mutual dyadic engagement) to unengaged communication (absence of any communicative engagement between mother and infant). Results showed that infant age and the type of communicative pattern mothers and infants engaged in determined the quantity and quality of infants’ vocalisation. The rate of speech-like vocalisations (sounds that tend to be uttered in the anterior area of the mouth, containing greater oral resonance) peaked at 4 months of age during symmetrical communication. When speech-like vocalisations decreased during symmetrical communication after the 4th month, they began to increase during unilateral communication (unilateral communication occurs when one of the two partners is actively trying to engage the second in an activity while the second is engaging in other activities with no mutual coordination between the two participants). The observed developmental changes, from speech-like vocalisations occurring primarily during symmetrical communication before 4 months to their increased occurrence during unilateral communication after 4 months, may reflect a transition in the mother–infant communication system from a dyadic form of face-to-face interaction to a triadic form of mother–infant–object/environment interaction (Hsu & Fogel, 2001). Because of this developmental shift, for a mother and infant from 4 months of age to sustain the joy of mutually engaging in pleasurable communicative activities, a development of specific types of interactions may need to be incorporated by the mother into their behavioural repertoire (discussed further in section 2.2.2). Hsu and Fogel (2001) propose that mothers’ contingent responsiveness to infants’ vocal communicative cues is not sufficient to enhance the production of speech-like vocalisations and that maternal responsiveness needs to be coupled with opportunities for creativity of expression within the dyad.

So far, this chapter has discussed young infants’ need for responsive and sensitive caregiving that supports their developmental well-being during the first six months of life. The theory of intersubjectivity and associated research indicates that infants are born with an intrinsic desire to socially interact. As the primary caregiver, it is the
mother’s affective and communicative interactions during the first six months that creates an environment that can fulfil her infant’s needs. The development of companionship between the mother and infant has been introduced into the discussion. The theoretical models and research that have highlighted the importance of the mother and infant developing an intimate relationship will now be presented.

2.2 Infants’ Need for Companionship: The Mother-Infant Communicative Partnership

As social and communicative beings, infants desire companionship (Reddy, Hay, Murray & Trevarthen, 1997). Infants’ and mothers’ communicative interactions have been described by Trevarthen (2001) as reflections of intimacy from which companionship is formed (as discussed in section 2.1.2). Zeedyk (2006) suggests that the term intimacy highlights the intensity of the intersubjectivity of infants’ exchanges with their mothers. These exchanges are orchestrated by visual, auditory, tactile and kinetic modalities which occur in ascending and descending levels of pleasure, and with predictable rhythm in the dyadic turn-taking (Zeedyk, 2006). The intimacy of these interactions has been likened to a dance where the infant gestures to the mother to partner him/her in a ‘dance’ of expressions that occur in rhythmic sequences, where the lead role is continually being exchanged from one partner to the other (Stern, 1977; Trevarthen, 1979). Infants’ sensitivity to timing and accurate coordination of communicative modalities when interacting with their mothers has also been described as musical (Malloch, 1999; Trevarthen & Malloch, 2000). Two theories that encompass such descriptions and recognise the notion of intimacy as being systemic in the communicative exchanges of the mother and infant are communicative musicality (Malloch, 1999) and affect attunement (Stern, 1985). These theories also acknowledge the mutuality of the mother and infant that is required for the pleasure of reciprocal interactions to occur.

2.2.1 Communicative Musicality

Malloch (1999) proposes that Communicative Musicality (CM) is the art of human companionable communication through which emotions and intentions are carried from one person to the other. The healthy mother and her infant communicate
through music-like interactions that occur as turn-taking episodes through the combination of vocalisations and bodily gestures that carry the elements of pulse, quality and narrative. The combining of these elements produces the medium through which emotion and intention are conveyed and mood states are regulated.

_Pulse_ (Malloch, 1999; Trevarthen & Malloch, 2000) is the regularity of behavioural events that occur in succession over time. By using a spectrograph, Malloch (1999) analysed a 6-week old infant and a 12-week old infant vocalising with their mothers. These infants and their mothers’ vocal communication showed regularity in the timing. While one partner is vocalising, the other is in a state of anticipation, waiting to reply. _Quality_ consists of the contours of vocal expression, both melodic and timbral, as they pass through time. Using a harmonic spectrum, mother and infant melodic vocalisations were analysed, showing the synchrony and matching of ascending and descending pitch levels. The analyses of a mother’s timbral qualities show her voice quality changes to match the vocal quality of the infant. Malloch (1999) suggests this could be the mother signalling to her infant that she has heard her and values her presence. Pulse and quality combine to create the _narrative_ structure of the companionship (Malloch, 1999). Narratives of individual experience and of companionship are built from the units of pulse and quality that exists between the mutually satisfying communicative relationship of mother and infant. Narratives are unique in that they are formed from the individual experiences of each mother-infant dyad and expressed through the combined gestures of vocalisation and bodily movements. The combination of pulse, quality and narrative produces co-operative and co-dependent communicative interactions between a healthy mother and her infant from which companionship is formed (Malloch, 1999; Trevarthen & Malloch, 2000).

### 2.2.2 Affect Attunement

Stern (1974) found evidence of early mutual regulation of mother and infant behaviours by studying moment-to-moment mother-infant play. He reported that mothers of 3- and 4-month old infants used high-pitched song-like speech, exaggerated facial expressions and close-range body placement to capture and retain the infants’ attention (these communicative characteristics will be discussed in detail in sections 3.2 and 3.3). Infants in turn used gazes, smiles and changes in head and
body position to initiate and respond to their mother. The mother’s speech and gestures appeared to stimulate the infant’s responsiveness and together the mother and infant delicately synchronised exchanges. Stern (1974) also found that infants disengaged with their mother by controlling their own direction of gaze, shutting their eyes or becoming glassy-eyed, indicating they could self-regulate their degree of social stimulation. From Stern’s pioneering research the theory of *Affect Attunement* was created to account for the dynamic emotional exchanges of mother-infant interactions. “Affect attunement permits the infant to know if what he or she experiences is shared by the mother and thus falls into the realm of the shareable” (Stern 1985, p.223). Affect attunement involves the matching of feeling state between caregiver and infant.

The matching of feeling states encompasses three stages of interactions and it is only in the presence of these conditions that affect attunement occurs (Stern, 2000). Firstly, the mother reads the infant’s feeling state from the infant’s overt behaviour. Secondly, the mother performs some behaviour that is not a strict imitation, but affectively corresponds to the infant’s overt behaviour. Thirdly, the infant must be able to read the mother’s response as referring to his/her own original feeling experience (Stern, 2000). In reference to the mother’s imitation of the infant during attunement Stern, Hofer, Haft and Dore (1985) note that the literal meaning of *imitation* is misleading when used to refer to mothers’ imitative behaviour associated with affect attunement. Absolute (or true) imitation is a reproduction of external behaviour whereas affect attunement renders feelings, indicating a matching and sharing of internal states (Stern, 2000). ‘True’ imitation does not permit the partners to refer to the internal state. Instead, the mother is constantly introducing modified ‘theme-and-variation’ type of imitation which is induced by the quality of feeling that is being shared (Stern, 2000).

Furthermore, attunement is displayed by mothers’ multimodal responsiveness (such as the combining of gestures with speech) to match those of the infants or to assist the infant in adjusting their mood. For example if the infant vocalises, the mother can attune by vocalising back, or with a gesture, or combining the vocalisation with gestures. Two forms of affect are identified by Stern (2000) which a mother-infant dyad attunes to – *categorical affects* such as emotions of sadness and joy, and *vitality*...
affects which represent the dynamic, kinetic qualities of the emotions. Vitality affects, consisting of vitality contours, enable a person to feel connected to another. Stern (2000, p.157) describes this connection as being like an unbroken line that consists of contours of expressions. The accomplishment of an attuned state entails the qualities of intensity, timing and shape. Intensity is the match between the infant’s physical behaviour and the intensity of the mother’s expressive behaviour. Timing refers to the infant’s capacity to match temporal patterns of the mother’s behaviour and shape is the shifting/changing of energy that is required to maintain a state of attunement.

The empirical evidence of Stern’s research on affect attunement has however been questioned regarding its robustness in light of the small sample sizes he has reported and that infant age range has not been well represented, with only infants of 8 months and older being studied (Jonsson & Clinton, 2006; Jonsson, Clinton, Fahrman, Mazzaglia, Novak & Sõrhus, K, 2001). In an attempt to address these possible problems, Jonsson et al. (2001) carried out a study that involved a total of 39 low-risk mothers and their infants of 2-12 months of age from Sweden and Serbia. This research investigated how mothers of two different cultures signal shared feeling-states to their infants and to determine if the occurrence of imitation (mothers mimicking their infants’ facial expression, movement and vocalisation) and affect attunement (mothers using varying modalities with affective emphasis to respond to infants’ behaviour) varied according to infant age. Mother-infant interactions during play were video recorded in the home setting. The Affect Attunement Protocol developed by Haft (1989), which measures intensity, rhythm, shape and duration of the mother’s and the infant’s reactions, was used to rate the reactions of the dyads. Results for both the Swedish and Serbian samples showed that a significant negative association of imitation and infant age was found while there was a significant positive association of affect attunement and age. Mothers’ imitation of infants’ behaviour occurred more frequently during the early months and by 6 months of age, the frequency of affect attunement showed an increase, and continued to increase, peaking at 12 months.

According to Jonsson et al. (2001) the results of this study show that while affect attunement is evident and increasingly present in the early mother-infant relationship
it is the mothers’ imitation that appears to be an important signalling mechanism in the early months. They suggest that imitation may aid the establishment and regulation of primary intersubjectivity (discussed in section 2.1.2). In addition, the positive correlation of infant age and affect attunement may reflect the developing affective nature of the mother-infant relationship. Over time, the attunement of the mother and infant could increase because of an increase in the pleasure they share during their communicative interactions.

Jonsson and Clinton (2006) also explored the types of infant behaviours that elicit mothers’ affect attunement. Similar to the study of Jonsson et al. (2001), a total sample of 34 low-risk Swedish and Serbian mothers with infants aged between 2- and 12 months were video recorded during play interactions in the home setting. A scale was developed to rate infants’ behaviour according to characteristics that were typically displayed during mother-infant playful interactions. Themes of behaviour were identified and rated in conjunction with the Affect Attunement Protocol (Haft, 1989). Using cluster analysis, results were split into two age groups – younger than 9 months and older than 9 months, as it is around 9 months of age that infants make a developmental shift from primary intersubjectivity to secondary intersubjectivity (Bråten, 1987; Trevarthen, 1993). Results showed that for both age groups and samples, mothers predominantly attuned to infants’ behaviour identified as pleasurable motoric behaviour over and above other categorised behaviours of effect initiation (infants’ effortful and striving behaviours), focusing (quietness and stillness), loss of balance (falling or toppling over), uncontrolled behaviour (such as infant sneezing, dropping an object) and displeasure (infant distress). The pleasurable motoric behaviour was characterised by Jonsson and Clinton (2006) as infants’ expressions of excitement and happiness, strong motor efforts and rhythmic movements such as kicking legs, clapping hands, shaking a rattle with delight, rocking their bodies back and forth joyfully. As previously mentioned in section 2.1.2, Trevarthen (2001, 2005) proposes that infants are born to socialise and develop behaviours through interacting with (primarily) their mothers. Infants are ‘clever clowns’ (Trevarthen, 2001) and for this behaviour to develop, they require an equally responsive mother who too can be a ‘clever clown’ by exchanging playful interactions and provide an environment that supports dyadic mutuality. As an outcome, affect attunement is achieved.
From the research of Jonsson et al. (2001) and Jonsson and Clinton (2006) it is possible that affect attunement of a mother and infant could increase as a consequence of the development of the positive dyadic relationship. This development however could be affected by the types of communicative interactions mothers share with their infants, as it appears the dominant type of behaviour that mothers attune to are their infant’s happy, playful rhythmical actions. The research of this dissertation will investigate if mothers’ practice of playful, musical activities is predominantly used over other types of musical activities, such as music for relaxation. Mothers’ musical communicative practice will also be investigated regarding its effects on mother-infant behavioural exchanges and dyadic reciprocity.

The theories of Affect Attunement and Communicative Musicality were developed from observing normal communicative interactions of mother and infant and have been discussed in order to present a picture of the intimacy that the mother and infant can share during positive communicative interactions and how companionship forms. Another theory that presents a model that accounts for the development of mother-infant communicative interactions, and which also underlies the mechanisms of affect attunement and communicative musicality, is that of intuitive parenting (Papoušek & Papoušek, 1987, 1995; Papoušek & von Hofacker, 1995) which was introduced in section 2.1.2.1. It is argued by Papoušek and Papoušek (1987, 1995) that mothers’ positive communicative interactions with their infants are intrinsically motivated. This theory suggests that mothers’ ability to interact with their infant is innate or biologically driven, and therefore mothers should not need assistance in understanding their infants’ communicative needs. If this is so, then this theory would align with the ideology that mothering comes naturally (Woollett & Marshall, 2001; Woollett & Nicolson, 1998) which was presented in section 1.2.1. However, the discussion and research evidence also presented in this section suggested the contrary may be the case, particularly for some first-time mothers who may be experiencing anxiety as a consequence of their role as primary caregiver. Importantly, Papoušek and von Hofacker (1995) also recognise this. They state a mother’s intuitiveness to communicate affectively with her infant functions well under stress-free interactional circumstances but may be inhibited or disturbed by
various stress factors, and as a consequence may cause some dysfunction in the dyadic relationship.

### 2.2.3 Risk Factors Affecting the Mother-Infant Communicative Partnership

Risk factors that impinge on the mother in her role as the primary caregiver such as maternal mood, infant temperament and social support (previously discussed in section 1.3) can affect her communicative interactions with her infant by interfering with the basic regulatory support needed and normally received by the infant during preverbal communication. In relation to the model of intuitive parenting, Papoušek and von Hofacker (1995) suggest that a mother’s interaction competence can be affected by her postpartum adaptation to parenting, availability to social resources, primary biological or psychological risks, familial experiences and psychopathological or personality factors. The inhibition of a mother to parent intuitively could result in (1) diminishing or absence of her playful interactions during infant’s non-distressed behaviour, (2) diminishing or absence of typical patterns of intuitive communication, (3) decreased parental attention to the infant’s feedback cues of self-regulatory processes, or (4) unpredictable, inadequate or inefficient parental responsiveness (Papoušek & von Hofacker, 1995). Infant behaviour such as persistent crying can also contribute to the inhibition of mothers’ intuitiveness. Persistent crying can perturb the dyadic communicative system by draining mothers’ psychobiological resources, and initiating a cycle of negative reciprocity which can lead to long-term interactional failures (Papoušek & von Hofacker, 1995).

Figure 2.1 presented by Papoušek and von Hofacker (1995) provides a model that encompasses the dynamic interactive system of both regulatory and communicative interactions of parents and infants up to 6 months of age. It also shows the dyadic dysfunction that can co-occur due to infants’ persistent crying and associated sleep and feeding problems that can result in the mothers’ lack of intuitive support for the infants. In an attempt to provide empirical evidence that supports this model, Papoušek and von Hofacker (1995) studied the interaction of mothers with infants and their associated crying, fussing, sleeping and play behaviours. Mothers’ biological and psychosocial risk factors relating to pregnancy, birth and postnatal
adaptation, family relationships and support systems together with infants’ health status were assessed.

Results showed that no single factor could account for the severity of infants’ persistent crying. Evidence from paediatric testing of infants’ gut problems or protein intolerance showed the incidence of such problems was negligible and it appeared that persistent crying was associated with a variety of interrelated biological and psychological factors which affected infant and mother interactions. Two distinct patterns of mothers’ behaviour were identified with the infants’ persistent crying. Infants of depressed mothers who showed delayed or absent intuitive responses became fussy and avoided visual contact with their mothers. Mothers who displayed agitated, anxious behaviour and tended to over stimulate in response to their infants’ gaze aversion were unable to pause and wait for infant initiatives and could not display contingent behaviours. Papoušek and von Hofacker (1995) noted that the absence of positive reciprocity during mother-infant interactions could become pervasive and affect intuitive parenting during what was otherwise stress-free play with their infants. Mothers’ feelings of anger, helplessness and exhaustion caused them to be emotionally unavailable for their infant and as a consequence they avoided playful interactions with their infants during the time infants were alert and

Figure 2.1 Postpartum development of parent-infant communication: a dynamic interactional model (modified from Papoušek, 1985; Papoušek and Papoušek, 1990). Figure reproduced from Papoušek and von Hofacker (1995, p. 213).
in a responsive state. As proposed by the model in Figure 2.1, the negative dyadic interactions give rise to a cyclic pattern of behaviours that could have long-term effects on the development of the dyadic relationship.

The risk factor of preterm infants born with Very Low Birth Weight (VLBW) has previously been discussed in section 1.3.2.2 regarding the effects of interventions devised to assist mothers’ sensitivity and responsiveness during interactions. In addition to the effects that infants’ birth conditions of LBW (Low Birth Weight) and VLBW has on the quality of mother-infant interactions, Poehlmann and Fiese (2001) studied family sociodemographic factors of mothers’ education, SES and cultural values as predictors of infants’ cognitive development at 12 months of age. To assess the dyadic interaction quality when the infants were 6 months of age, mothers played an interaction game (such as peek-a-boo, tickly rhyme or bouncing game) that the infant was familiar with. The quality of interactions were rated using the Pediatric Infant Parent Exam scale (PIPE; Fiese, Poehlmann, Irwin, Gordon, & Curry-Bleggi, 2001). The interaction was scored for the degree of reciprocity and positive affect at the beginning, the middle and the end of the game. Maladaptive interactions were indicated by mothers’ disengagement or intrusiveness and infants’ response of negative affect (such as crying). The mother would continue the game despite the infant’s protest. At 12 months follow-up, infants’ cognitive developmental abilities were assessed. Results indicated that the quality of dyadic interactions as characterised by reciprocity, positive affect and engagement at 6 months mediated the relation between the severity of perinatal risk and infant cognitive development at 12 months. Despite their level of neonatal risks associated with being born with LBW and VLBW, infants who experienced early positive interactions with their mothers were likely to display more advanced cognitive skills at 12 months than infants who experienced problematic interaction with their mothers. Maternal sociodemographic factors did not moderate the relation between neonatal risk and cognitive development. Poehlmann and Fiese (2001) concluded that these results reflect the transactional framework of reciprocity - that developmental outcomes are the function of continuous, dynamic interactions between the child and the experiences provided by their families.


2.3 Summary

This chapter has presented evidence that infants begin life with finely tuned communicative behaviour that enables them to participate in their social environment. The development of their communicative interactions is however dependent on their mother as the primary caregiver and the environment that she creates. Through the mutually pleasurable interactions with their sensitive and responsive mother, infants’ desire for companionship is met. Based on empirical evidence, it has been argued that the mother and infant affective relationship develops over time through the frequency and intimacy of their communicative exchanges. Infants’ desire for joyful and playful interactions, as discussed in the theory of primary intersubjectivity, has been supported by research that shows mothers attune more to infants’ happy, playful rhythmical behaviour than other types of behaviours. The reciprocity of the mother and infant however can be disrupted by certain risk factors that affect the development of their relationship by depriving them of pleasurable dialogic companionship.

The mother’s role in the communicative partnership has been established in this discussion as being pivotal to the infant’s development. Further discussion will be presented in Chapter 3 that details the specific elements and functions of the communicative system that a mother uses to engage her infant and how communicative activities based on music and movement could benefit the developing relationship of the mother and her infant in the first 6 months of life.
CHAPTER 3

Communicative Processes and their Functions in Mother-Infant Interactions
This chapter discusses the communicative processes that mothers use when interacting with their young infants. It will consist of four parts: (3.1) the communicative system, (3.2) vocal communication, (3.3) gestural communication, and (3.4) movement. Within these sections, the specific functions and characteristics of these communicative modes will be discussed with relevance to the analysis procedures used in the research of this dissertation. Research evidence will be presented showing that mothers use various combinations of vocal, gestural and movement interactions when communicating with their infants. From this evidence it will be argued that the first-time mother’s developing relationship with her infant could benefit from being encouraged to practice music and movement activities that promote the mother’s communicative use of the voice, gestures and rhythmical movement.

### 3.1 The Communicative System

Mothers’ sensitive communicative interactions provide their infants with feelings of security and well-being (Honig, 1982, 1995; Papoušek & Papoušek, 1987) and will, to large degree, lay the foundation for the infants to develop and function as an effective communicator in a larger social context (Van Egeren & Barratt, 2004). The effectiveness of the interactions is not determined by a single mode of communication acting independently but is the combination of communicative processes that mothers use at any given time. For example, when a mother speaks with her infant, it is usually accompanied by facial gestures that match the mother’s affect, this being a multi-modal mean of communication. In addition a mother may engage with her infant through rhythmical movement such as swaying, or stroking the infant to soothe while singing. Figure 3.1 illustrates how the communicative processes act together and the mediums through which they are expressed to the infant.
The following will detail the three types of communicative processes (voice, gestures and movement) and how the specific mediums used by mothers appear to successfully engage their infants.

### 3.2 Vocal Communication

The primary vocal communicative styles that mothers use when interacting with their infants are melodic speech and singing (Trainor, Clark, Huntley & Adams, 1997; Trehub & Nakata, 2002). It is argued by Mechthild Papoušek that these types of maternal vocal communication are a product of *intuitive parenting* (as discussed in section 2.1.2.1) This means that when speaking or singing to their infants, sensitive mothers unconsciously adjust the vocal communicative input either to match the mood of the infant or to regulate their states of arousal, attention and affect (M. Papoušek, 1996; Papoušek & Papoušek, 1987). As infants mature, their behavioural input into the healthy mother-infant relationship develops into episodes of reciprocal vocal play and vocal matching, producing a repertoire of predictability for the infant.
that is believed to instil a sense of security (Van Egeren & Barratt, 2004). However, the degree of mothers’ sensitivity and intuitiveness displayed toward their infants may vary due to certain factors, as has been discussed in previous sections 1.3.2.1 and 2.2.3.

It has been recognised by Papoušek and von Hofacker (1995) that anxiety can inhibit or disturb a mother’s intuitiveness to communicate affectively with her infant and as a consequence perturb the dyadic relationship (discussed in section 2.2.2). As discussed in section 1.2, first-time mothers in the early period of parenting are more likely than multiparous mothers to be affected by feelings of anxiety concerning their ability to parent (Crouch, 2001; Barnard & Martell, 1995; Choi et al., 2005; Thorpe & Elliot, 1998; Van Egeran, 2003). Furthermore, the study by Goldstein et al. (1996) (discussed in section 1.3.2.1) showed that first-time mothers’ stress associated with their caregiving role significantly increased in the first 3 months of the postpartum period. Mothers’ stressed state was shown to affect their sensitivity and affective expressiveness during interactions with their infants. As a consequence, such interactions could negatively affect the development of a mutually enjoyable mother-infant relationship.

Encouraging first-time mothers’ use of communicative activities with their infants that focus on music and movement could assist the development of the dyadic relationship. In order to support the argument that such communicative activities could benefit the first-time mother-infant relationship, discussion of the characteristics and functions of infant-directed speech and singing will be followed by a review of the communicative functions of gestural and movement interactions.

### 3.2.1 Infant-Directed Speech and Its Characteristics

*Infant-Directed Speech (IDS)* is the term applied to the universal speaking style that adults adopt when addressing infants. Research has shown that infants prefer to listen to IDS over Adult-Directed Speech (ADS) – adults speaking to adults – and that this preference is associated with the distinct characteristics of IDS (Andruski, Kuhl & Hayashi, 1999; Fernald, 1992; Fernald & Kuhl, 1987; Grieser & Kuhl, 1988; Kuhl, Andruski, Christovich, Christovich, Kozhevnikova, Ryskina, Sundberg, Stolyarova & Lacerda, 1997; Liu, Kuhl & Tsao, 2003). Compared to ADS, IDS has:
• higher pitch, which is thought to initially attract the infants’ attention;
• expanded pitch range, slower tempo and duration of the speech which sustains infants’ attention;
• increased contours of rising and falling pitch in combination with a more distinct rhythm, which conveys affection;
• exaggerated articulation referred to as hyperarticulation which presents as a didactic function of the speech

Furthermore, there is evidence that suggests infants prefer the IDS of their sensitive mother over that of another adult (Stern, Spieker, & MacKain, 1982; Fernald, 1992; Fernald & Kuhl 1987). This preference is associated with the heightened acoustic characteristics that sensitive mothers produce in their speech when interacting with their infants, as well as infant familiarity with their mother’s voice.

Infants’ preference for their mothers’ IDS over the speech of other adults could however be determined by infant development. Cooper, Abraham, Berman and Staska (1997) investigated preferences for maternal IDS in 1- and 4-month old infants. The 1-month old infants showed no listening preference for maternal IDS over maternal ADS. However, on hearing recordings of unfamiliar females’ IDS and ADS these infants did show preference for the IDS over the ADS. The results of the 4-month old infants showed there was a significant difference, with the infants preferring their mothers’ IDS over the ADS. From these results Cooper et al. (1997) suggested that although infants generally show preference for IDS over ADS, preference for maternal IDS appears to be an emergent feature of the infant’s early perceptual experience. An explanation of these results offered by Cooper et al. (1997) was that at birth, the newborn could be likely to be more familiar with maternal ADS than IDS (which would certainly be the case of the first born child) and that preference for maternal IDS may develop as the context of mother-infant interactions changes across the first few months after birth. During these early months, the mothers’ affection for her infant could increase as the dyadic relationship develops (and maybe also as a result of the mother responding to the infant’s development). As a consequence, the affective qualities of the maternal IDS may become increasingly pronounced, with the infants’ preference for maternal IDS being determined by such qualities of mothers’ vocal interactions.
Further evidence that supports the need for mothers’ sensitive vocal interactions with their infants is that it could also be an important determinant for infant development. Monnot (1999) studied the effect of mothers’ positive speech directed to their infants aged 3-4 months and found there was a positive correlation between infant growth and mothers’ sensitive responsiveness to the infants’ needs through IDS. It appears that the quality of maternal speech characteristics is a crucial component in the development of the infant and for the mother-infant relationship in the early postpartum period.

The differences in the characteristics of IDS compared to ADS have been studied using various analyses procedures. The following sections 3.2.1.1 and 3.2.1.2 will discuss the production of pitch and articulation of speech, and in order to provide underpinning knowledge required for an understanding of Study 2 of this dissertation, specific methods of analyses will be introduced into the discussion relevant to the investigation of maternal IDS compared to ADS.

3.2.1.1 Pitch and Fundamental Frequency (F0)

The term pitch refers to the aspect of sound that we perceive (hear) and enables a listener to place the (perceived) sound on a scale varying in degrees from low to high (Ladefoged, 1993, 1996, 2001). Accordingly, the pitch of a sensitive mother’s IDS is perceived to be higher than the pitch of her ADS.

The pitch that we hear is produced by the vibration of vocal folds (cords) which form sound waves or waveforms (Ryall, 1996). The rate at which the vocal folds vibrate is known as the fundamental frequency (F0) and is measured in Hertz (Hz), a measure that indicates cycles per second. For a fundamental frequency (F0) of 100Hz there are 100 complete openings and closings of the vocal folds in one second (Ryall, 1996). Ryall (1996) notes that adult male speakers have an average F0 of approximately 100 to 120 Hz and females from about 160 to 200Hz. These differences in the fundamental frequency of male and female adult speech occur because the vocal folds produced by adult female speakers are typically shorter and have less mass, and vibrate at a faster rate than those in adult males, creating a higher F0, thus producing a higher sounding pitch. The sensitive mothers’ F0 of their IDS is
generally higher than the average for an adult female’s ADS. The F0 of maternal IDS can also vary depending on type of mother-infant interactions (for example, the lower pitch of a calming/soothing interaction compared to a higher pitch of joyful play interactions). Fernald and Mazzie (1991) measured the F0 of mothers’ speech while reading a picture book during play with their 14-month old infants and then compared it to reading the book to an adult. Results showed the IDS mean F0 maximum to be 388 Hz (284 Hz for ADS) and the IDS mean F0 minimum to be 192 Hz (172 Hz for ADS).

A spectrograph can be used to measure the pitch of speech. Figure 3.2 illustrates a spectral display produced by a program for acoustic analysis known as PRAAT\(^1\) (Boersma & Weenink, 2004) which was used for analyses of speech in Study 2. In the top window, it shows the waveform for the production of the words *We stop doing the right thing*. The waveform is marked by fine vertical blue lines indicating the individual waveform cycles. The vowels of the words are marked by greater acoustic intensity illustrated by the darker black markings in the middle window. Formants (red dots), F0 (blue line) and intensity (yellow line) are also shown in this window. The words are shown in the bottom window.

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\(^1\) The PRAAT program illustrations were obtained from the internet site of [http://www.stanford.edu/dept/linguistics/corpora/material/PRAAT_workshop_manual_v421.pdf](http://www.stanford.edu/dept/linguistics/corpora/material/PRAAT_workshop_manual_v421.pdf)
Research has shown that the vowels /i/, /u/ and /a/ (as in the words sheep, shoe and shark) have a higher mean pitch in mothers’ IDS compared to their ADS production (Burnham, Kitamura & Vollmer-Conna, 2002). As an example of how the vowels are illustrated on a spectrogram, Figure 3.3 shows the waveform of the speech production of the vowel /a/ as in the word shark. The waveform section shows the vowel’s F0 was measured at the onset (the start of vowel’s articulation) and the offset (the end of the vowel’s articulation). The F0 measurement for the vowel /a/ is approximately 140.70 Hz and is seen on the lower right hand side of the display, indicated by the horizontal blue line marked as Pitch.
The vowels /i/, /u/ and /a/ are also referred to as point vowels because they are acoustically extreme from each other known (Andruski, Kuhl & Hayashi, 1999; Ladefoged, 2001). The acoustic extremities of these vowels are useful in studying the articulation of mothers’ IDS compared to their ADS. Before the discussion focuses on research of mothers’ pitch and articulation of their IDS compared to ADS, the following section discusses how the articulation of speech occurs.

### 3.2.1.2 Articulation and Formants

When we speak, our tongues, lips and other vocal organs work as a system that produces different speech sounds (Ladefoged, 1996). It is the vibrations of the air in the passages of the mouth, throat and nose (which together form the vocal tract) that initiate the production of the waveforms that are illustrated in Figures 3.2 and 3.3. The articulation of speech is dependent on the shape of the vocal tract airway that extends from the lips down to the vocal folds (cords), and the position of the tongue (Ladefoged, 1996). The vibration of the vocal folds provides a sound source which resonates in two cavities, one behind the tongue and the other in the front of the tongue producing formants, and each of these cavities resonates at a particular formant frequency (Ryall, 1996). Essentially, formants are concentrations of acoustic energy around a particular frequency in the waveform that can be used to measure the variability in the articulation of the vowel sounds. The resonance of the cavity...
behind the tongue accounts for the first formant frequency (F1) and the cavity in front of the tongue accounts for the second formant frequency (F2). These two formant frequencies change according to the different placement of the tongue which determines the differences in the production of vowels (Ladefoged, 1993, 1996, 2001). The third formant frequency (F3), which is affected by the position of the lips, has very little to do with distinguishing the articulation of vowels (Ladefoged, 1993, 1996, 2001).

Figure 3.4 illustrates the changes that occur in the shape of the vocal tract from the lips to the throat region when the vowel sounds of /a/, /i/ and /u/ are articulated in the words father, heed and pool (or the words shark, sheep, and shoe that were used in the analyses of Study 2). As previously mentioned, these vowels are known as point vowels as they represent extremes in articulation. Figure 3.4 shows an example of differences in the first, second and third formant frequencies of the three point vowels. The first peak (F1) is the highest in amplitude of the three because the acoustic energy is at its greatest in the production of this formant. The second peak and the third peak are the F2 and F3 respectively.

*Figure 3.4* The shapes of the vocal tract when articulating the vowels /a/, /i/ and /u/ and their formant frequencies.

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2 The illustration of Figure 3.4 was obtained from the internet site of [http://hyperphysics.phy-astr.gsu.edu/hbase/music/vowel.html](http://hyperphysics.phy-astr.gsu.edu/hbase/music/vowel.html)
Referring back to the spectral displays of Figures 3.2 and 3.3, the red dotted lines indicate the formants and can be seen as the darkened areas or bands of the spectrogram. The darker a formant is in this display, the stronger it is, indicating the more energy present in the production of it (Ladefoged, 1993). The F1 is seen in Figures 3.2 and 3.3 as the darkest band and defined by the bottom red dotted lines. Progressing upward from the F1 is the F2, illustrated by the next sequence of red dotted lines, and so on. It is the F1 and F2 frequencies which were relevant to the research of Study 2 as it is these formants that determine the extremities associated with distinguishing the articulation of the point vowels and in particular the difference in mothers’ articulation of IDS compared to their ADS (to be discussed further in section 3.2.2.3).

Having summarised some basic information about vocal pitch and articulation, discussion is now required to put the characteristics of speech into context regarding the communicative functions of IDS, and in particular maternal IDS and its importance to the mother-infant relationship.

3.2.2 The Communicative Functions of Infant-Directed Speech

In general, there are three main functions of IDS: (i) the attentional function that attracts and sustains infants’ attention, (ii) the social/affective function that communicates affect and (iii) the linguistic function that serves as an instructional, didactic component. These functions are associated with combinations of the unique characteristics of IDS (Cooper et al., 1997; Grieser & Kuhl, 1988; Trainor Austin & Desjardins, 2000) that were discussed in section 3.2. Study 2 will investigate the effects of music and movement on these three functions of maternal IDS.

3.2.2.1 The Attentional Function of Infant-Directed Speech

Compared to mothers’ ADS, research has found that their IDS has a the higher F0 (Burnham, Kitamura & Vollmer-Conna, 2002; Kitamura & Burnham, 2003) which is thought to initially attract infants’ attention, and the expanded range of the pitch (or extremities of the pitch) and slower tempo/duration of the speech sustains infants’ attention (Stern, Speiker, Barnett & McKain, 1983). The production of these characteristics present as the attention function of IDS. Similar to these attentional
characteristics of IDS, the prosody of maternal IDS attracts and sustains infants’ attention. In addition however it is thought to play a specific social and affective function through the contouring of the pitch and the rhythm of the mothers’ speech when interacting with their infants (Fernald, 1989, 1992; Mozziconcci, 2002; Stern, Spieker & MacKain, 1982).

3.2.2.2 The Social/Affective Function of Infant-Directed Speech

Prosody refers to the intonation and rhythmic elements of speech. Prosody in ADS encodes information about the syntactic and speech structure of the language and conveys the speaker’s emotions and attitudes (Nooteboom and Kruyt, 1987). Prosodic patterns of IDS are thought to have both attentional and social/affective functions. The discriminating characteristics of the prosodic patterns in IDS are the higher F0, the greater expansion of the pitch range (similar to the attentional function of IDS) together with the exaggeration of pause duration which forms the simple pitch contours that mark the boundaries between phrases of speech. Together these characteristic convey mothers’ affection to their infants (Fernald, 1989, 1992; Mozziconcci, 2002). These characteristics are also thought to assist the infant in tracking and segmenting the speech stream and serve as a communicative turn-taking medium between mother and infant assisting the development of the mother-infant relationship (Fernald, 1989).

The prosody in mothers’ IDS has been referred to as melodic speech. Fernald (1989) and Trainor et al. (1997) suggest the relation of prosodic form to the communicative function enables mothers’ voices to convey affection to their infants. Specific to the mother-infant relationship, Grieser and Kuhl (1988) and Trainor, Austin and Desjardins (2000) suggest that prosody is the most important feature of IDS because of its social and affective function that assists in creating and maintaining a bond between the caregiver and the infant. The prosodic elements of maternal IDS are probably crucial to the development of mother-infant reciprocity.

As part of intuitive parenting, sensitive mothers’ use of prosody begins with their newborns (M. Papoušek, 1996; Papoušek & Papoušek, 1987). As infants develop, it appears that sensitive mothers increase their prosodic elements of IDS during the early postnatal months, and by four months the pitch contouring in the maternal IDS
emerges as a prominent aspect of mothers’ vocal communication with their infants (Stern, Spieker Barnett & MacKain, 1983). It was proposed in section 3.2.1 that infants’ increasing attention to their sensitive mothers’ vocal communication during the first 4 months could be because mothers’ affection for their infant increases during this time as indicated by the acoustic qualities of their speech. If the prosody in maternal IDS does increase during this early postpartum period, as shown by the study of Stern et al. (1983), then it could be that the influence of this process is an effect of the developing emotional bond between the mother and infant.

Another aspect of the intonation and rhythm of maternal IDS are the specific communicative intentions that mothers convey to their infants. Via the rise and fall of intonation contours, the communicative intentions of mothers’ speech to their infants have been described by Fernald (1989, p.1499) as ‘stereotype melodies’. Fernald (1989) exemplifies this by suggesting mothers’ expressions of praise such as ‘clever girl’ are generally spoken using similar exaggerated rise-fall contours. Mothers tend to use falling pitch contours to soothe their infants and rising contours to attract attention and to encourage infant responsiveness. When the infants’ attention has been established, the bell-shape pitch contour is used to sustain attention.

Burnham, Kitamura and Vollmer-Conna (2002) developed five scales that rate the communicative intentions of mothers’ speech to their infants: Positive or Negative Vocal Affect, Express Affection, Encourage Attention, Comfort or Soothe, and Direct Behaviour. These scales have been used by adult listeners to rate their perception of communicative intent in speech to infants from birth up to 12 months of age. Kitamura and Burnham (2003) found that by the time infants are 3 months old, the perception of Comfort or Soothe in the mothers’ voices is beginning to decrease. These results indicate that as infants mature they are better able to regulate their own emotions, relying less on the comfort and soothe in their mothers’ voice. Results of Positive Affect, Express Affection and Encourage Attention continued to increase from birth with peaks occurring at 6 and again at 12 months, and Direct Behavior peaking at 9 months. Kitamura and Burnham (2003) suggest these results are indicative of the developing mother-infant relationship. These scales will be used in
Study 2’s investigation of the effect of music and movement on mothers’ affective speech when playing with their infants.

### 3.2.2.3 The Linguistic Function of Infant-Directed Speech

Section 3.2.1.2 discussed how our vocal tract produces the differences in the articulation of the point vowels /i/, /u/ and /a/. The difference in the articulation of these vowels produced by the sensitive mother in her IDS compared to her ADS consists of the exaggeration of the acoustic/articulatory phonetic units that occurs in IDS. This articulatory characteristic of IDS is termed hyperarticulation. The communicative function of hyperarticulation in maternal IDS appears to be an essential part of the language development of the child and is considered to be an important didactic component of IDS. The articulation of IDS, and in particular maternal IDS of the sensitive mother, is characteristically more intelligible than ADS (Burnham, Kitamura & Vollmer-Conna, 2002). The difference that occurs in the acoustic production of ADS and IDS vowels shows that the IDS vowels are more extreme in the F1 and F2 measurements and in general, when plotted on an x and y axis, the vowel space (representative as a triangle) is larger than the vowel space of ADS. This means there is an increased acoustic distance between the IDS vowels producing more intelligible speech, thus providing a link between the quality of maternal speech input at the phonetic level and infants’ perception of the phonetic units of language (Liu, Kulh, & Tsao, 2003).

Figure 3.5 illustrates a plot of the F1 and F2 values of the point vowels /i/, /u/ and /a/ which are represented by the vowel triangles. Because of the exaggeration of the vowels’ extremities produced in the mothers’ IDS, the area of this triangle is larger than that of the ADS vowels. Using the formula of $1/2*[X1(Y2-Y3) + X2(Y3-Y1) + X3 (Y1-Y2)]$ where X and Y are the mean F1 and F2 values and 1, 2, and 3 are the point vowels, /i/, /u/ and /a/ respectively (Andruski et al., 1999) the actual areas of the triangles can be calculated for comparison.
Because these point vowels also occur in most of the world’s languages, cross-cultural differences in the articulation of IDS and ADS can be studied (Andruski, Kuhl & Hayashi, 1999). Kuhl et al. (1997) studied the articulation of maternal IDS and ADS of native-speaking mothers from United States, Russia and Sweden whose infants were aged between 2 and 5 months. Native language words containing the point vowels /i/, /u/ and /a/ were preselected for analysis in the three languages. The IDS and ADS F1 and F2 values of the three vowels were plotted (in the same manner as illustrated in Figure 3.5 above). From these points, vowel triangles were formed by joining the points of the vowel plots to represent the acoustic space between the measurements of the vowel formants. The results showed that across the three languages the area of the acoustic space (the vowel triangle) was greater for the IDS vowels than for the ADS vowels. This means that the articulation of the vowels became more pronounced when the mothers spoke to their infants than when they spoke to an adult. The findings of this study indicate that the hyperarticulation of these vowels has culturally universal characteristics (Kuhl et al., 1997).

Other studies have replicated the analysis method used by Kuhl et al. (1997) by plotting the F1 and F2 values of the point vowels /i/, /u/ and /a/ to compare the articulation of IDS and ADS and have found similar results - that maternal IDS is hyperarticulated (Andruski et al. 1999; Burnham, Kitamura & Vollmer-Conna, 2002;
Liu et al. (2003). Burnham et al. (2002) studied vowel articulation to assess if hyperarticulation is unique to maternal IDS. They compared mothers’ speech with their 6-month old infants to the speech they directed to their pet dog or cat, and to another adult. Results showed that infant-directed and pet-directed speech were similar with regard to heightened pitch, distinguishing them from the lower pitch of ADS, but only the infant-directed speech contained hyperarticulated vowels. Burnham et al. (2002) concluded that the hyperarticulation is therefore likely to be a didactic function, serving to promote language learning for the infant because the exaggerated form effectively separates sounds into contrasting categories and enhances a child’s ability to imitate and learn speech.

In an attempt to provide further evidence that hyperarticulation has a didactic component in maternal IDS, Liu et al. (2003) studied Mandarin speaking mothers of infants 6-8 and 10-12 months of age. Results showed that the vowel space area was significantly correlated with infants’ speech discrimination which was measured using a head-turn conditioning procedure. The authors concluded that maternal speech clarity is a didactic technique that directly affects infants’ early language learning. This study also provides further evidence of vowel hyperarticulation as being culturally universal. Additional results reveal that vowel hyperarticulation in maternal IDS is unlikely to be attributed to socioeconomic factors of parental education, income and occupation.

The implications of these latter findings to the research of this dissertation is that if variability of these socioeconomic factors exists within the sample of first-time mothers in Study 2 it is unlikely that they will influence results. Furthermore if increases to the production of hyperarticulation in mothers’ IDS occurs after participation in a music and movement program, then this may benefit infants’ language development by enhancing their ability to imitate and learn speech.

3.2.3 Infant-Directed Singing and Its Communicative Functions and Characteristics

Characteristics of IDS such as heightened pitch, expanded pitch range, and slow tempo are also present in maternal singing and are finely tuned to the affective state of the infant (Bergeson & Trehub, 2002; Trehub, Trainor & Unyk, 1993). So the
functions of maternal speech and singing have been compared, as they enhance infants’ attentiveness, and soothe and promote an affective state between mother and infant (Trehub & Trainor, 1998). However, mothers’ singing to their infants as a practice could provide a communicative medium that is more effective in enhancing the development of the mother-infant relationship than maternal IDS. Evidence will now be presented in support of the need for mothers to sing to their infants.

Maternal infant-directed singing, like maternal infant-directed speech, attracts infants’ attention and could serve as a didactic function (Trehub & Trainor, 1998). ID singing, like IDS, also provides opportunity for mothers’ social interactions and expressive emotions to be conveyed to the infant which enhances the interpersonal dyadic relationship (Longi & Karmiloff-Smith, 2004; Nakata & Trehub, 2004). However, singing may be more effective in communicating emotional information from mother to the infant than maternal speech (Nakata and Trehub, 2004).

Trehub (2003) argues that the human singing voice is the most enriching form of musical stimulation for the infant. Furthermore, research evidence suggests that infants prefer maternal singing over maternal speech (Nakata & Trehub, 2004). If this is so, then importantly, mothers’ singing to their infants is a communicative activity that should be part of the caregiving routine. Nakata and Trehub (2004) studied infants’ (5.5-6.5 months of age) attention to maternal singing and maternal speech. Using audio-and visual recordings of mothers directing speech and singing to their infants, infants’ preferences were measured according to the time that infants spent looking at the stimuli. The results revealed that infants displayed more sustained attention to the audio-visual stimulus of the maternal singing than the maternal speech. The maternal IDS was higher in its overall pitch level than the ID singing and had greater fluctuations in pitch and timing. It was suggested that this variability could attract young infants’ attention initially but singing tends to sustain their attention. If, as these results suggest, singing is more effective than speech in maintaining infant attention then it could also serve a function that benefits the mother-infant relationship. While the infant maintains interest/delight in the mother’s singing, the mother is likely to continue to sing, expressing her enjoyment to the infant. Mutually pleasurable exchanges could be an outcome of mothers singing to their infants, and strengthen the development of the mother-infant partnership.
Differences in acoustic characteristics of ID speech and ID singing may not be the sole reason that maternal singing sustains infants’ attention. Nakata and Trehub (2004) suggested that infants’ preference could be a result of the familiarity of mothers’ singing songs that are consistently performed at the same pitch and tempo compared to the variability that exists in mothers’ IDS. Also, the social context associated with the mothers’ ritualised singing, where certain songs are sung during particular caregiving routines within the day, could be comforting for the infant (Bergeson & Trehub, 2002). Through repetition of this consistent singing style and performance time of particular songs, the infant could learn to predict the mother’s behaviour and such familiarity could enhance the infant’s feelings of security.

If infants’ preference for maternal singing over maternal speech is a learned association with their feelings of security, then infants’ preference for maternal singing may not be present as a neonate. To provide evidence regarding the possibility that infants’ preference for singing could be a product of their perceptual learning or familiarity process, Masataka (1999) studied two-day-old hearing infants of deaf (non-speaking) Japanese parents. These infants would not have had the prenatal experience of listening to the parents’/mothers’ voice in utero, eliminating any prenatally learned cues of their parents’ speech. The listening stimuli were a Japanese play-song (Medaka no Gakko) and an English play-song (Itsy Bitsy Spider) that were recorded by 10 Japanese speaking mothers and 10 English speaking mothers of 6-month-old infants. The results demonstrated that the newborns showed preference for Infant-Directed singing over IDS in both languages which was determined by the duration of their looking time at a visual stimulus while listening to songs. Masataka (1999) argues that these results demonstrate infants’ preference for maternal singing is not dependent on any specific prenatal or postnatal experience. Importantly, it may be that singing has universal attentional and affective significance.

The evidence presented suggests that maternal Infant-Directed singing may well be more effective than maternal Infant-Directed speech in conveying emotions, maintaining infant attention and as a consequence enhancing the interpersonal relationship of mother and infant (Trehub & Nakata, 2002). However, this evidence
is not suggesting that mothers’ singing is more important than their IDS. Clearly, maternal singing has a specific effect on infants’ attention during face-to-face interactions. The argument that arises from this evidence and relevant to this dissertation is that mothers’ singing should be included as part of their communicative repertoire of activities they share daily with their infants in the early postpartum months. The first-time mother in the early developmental phase of her role as parent could be supported by a program that encourages her to sing to her infant. Another consideration in promoting maternal singing through a program is that the type of songs may have specific communicative intentions. Song types and their varying musical characteristics could convey distinct emotions when mothers’ engage with their infants (Longi & Karmiloff-Smith, 2004). The following section will present research evidence on specific types of songs and singing styles that mothers use to engage their infants.

3.2.3.1 Song Types and Singing Styles as Means of Communication

Lullabies and playsongs are the two song types which are traditionally sung to Western infants and have been extensively researched. They are dramatically distinct in the emotional messages they convey to the infant and differ lyrically and musically. Joy and happiness best describe the emotions expressed when singing up-tempo playsongs (Trainor et al. 1997) and the emotions of affection and tenderness are associated with the singing of a lullaby at a slow tempo (Trehub & Nakata, 2002).

The lyrics of lullabies are usually suggestive of a calming mood to induce sleep (e.g. the first phrase of Brahms Lullaby – ‘Go to sleep, rest in peace), are slow in tempo, of smooth rhythm, are sung in a lower pitch (Rock, Trainor and Addison, 1999; Trainor et al., 1997), have narrow pitch range, contain simple repeated pitch contours (Trehub & Schellenberg, 1995) and are repetitive and softer in dynamics (Shoemark, 1999). The singing of lullabies to infants can facilitate the transition from being awake and aroused to being lulled to sleep or from being distressed to calm, fostering feelings of security in the infant. Cassidy and Standley (1996) carried out research into the value of using lullabies as therapy for premature infants in a Neonatal Intensive Care Unit. The listening of lullabies through earphones sung by a female vocalist with orchestral accompaniment appeared to relax and comfort these usually irritable infants, positively affecting oxygen saturation levels, heart rate and
respiration. While the therapeutic effects of the qualities of the female voice are recognised in such research, it is the voice of the mother that appears to be more affective for the infant (Standley & Madsen, 1990). Connecting the use of lullabies with the importance of a mother’s role in the development of positive infant mental health, a mother singing a melody in a slow tempo enables the infant to relax and match the mood state of the mother creating mutual pleasure (Brand, 1985).

In contrast to the lullaby, Trehub and Trainor (1998) suggest that playsongs arouse infant attention through the lively tempo and fun-like performance which can include gestural dramatisation using facial expression, hand clapping to emphasise the beat, and the didactic element of the lyrics and their repetition (e.g. *Put your finger on your nose, on your nose, Put your finger on your nose on your nose, Put your finger on your nose, as the warm wind blows, Put your finger on your nose on your nose*).

Research by Trehub, Unyk, and Trainor (1993) has shown that the types of songs mothers prefer to sing to their infants could differ across cultures. They studied the singing styles of Hindu-speaking mothers (from India and North America) and English-speaking mothers (from North America) of young infants. Hindu mothers preferred to sing soothing songs with religious content that were slower in tempo than the English speaking mothers’ songs, who favoured playful songs that aroused infants’ interactions. A study of North American parents by Trehub, Unyk, Kamenetsky, Hill, Trainor, Henderson and Saraza (1997) also showed that the singing of playsongs was preferred over the singing of lullabies. From the entries of a one-day diary, it was shown that play songs represented 64% and lullabies only 11%. Trehub et al. (1997) suggest this preference could be culturally influenced as mothers indicated that they acquired knowledge of songs primarily through popular recordings of children’s songs and television programs, which mainly feature playsongs.

However, contrary to the results of Trehub et al. (1997) are the results of a study by Custodero and Johnson-Green (2003). They carried out a telephone survey of 2250 American English-speaking parents of 4-6 month old infants to determine the type of songs parents sang to their young infants. Of this sample, mothers represented 73% with the remaining 17% being fathers. Regarding the types of songs the parents sang
to their infants, results showed that 66% reported singing lullabies, 21% reported singing songs they created themselves and 13% sang popular songs to their infants. Furthermore, an Australian study by Vlismas and Bowes (1999) showed that 39 middle-class first-time mothers with infants under the age of 6 months had very limited knowledge of appropriate song types to sing to their infants. Of the thirty-nine mothers, only two (5%) reported singing lullabies to their infants because they knew the lyrics of the songs.

These findings according to song types being sung to infants could have ramifications on their developmental needs. For example, if mothers predominantly sing songs of slow tempo similar to the lulling effect of a lullaby, infants could be deprived of the arousal effects of the playsong and the mother’s fun-like behavioural interactions that accompany this song type. Conversely, if the infant primarily experiences the arousal of the playsong, their need for the calming effect of the mother’s voice, expressed through the singing of a lullaby, may not be met. The encouragement of mothers singing both fun-like and soothing songs may be required if infants are to fully benefit from the communicative effects of maternal singing.

So far, the evidence presented about playsongs and lullabies shows that both types of songs have specific communicative purposes and mothers singing these song types to their infants could communicate affective messages and assist in the self-regulation of infant mood states. However, there is evidence that suggests infants could be sensitive to the elements of the singing styles, not to the type of song. Longi and Karmiloff-Smith (2004) suggest that although the tempo of singing is relative to the type of song, mothers vary the tempo to match the infant’s mood state. Singing at a fast *allegro* tempo attracts the infant and the slower *andante* tempo sustains interactions.

To determine infants’ sensitivity to performance style, independent of song type, Rock, Trainor and Addison (1999) studied mothers’ singing with their infants who were 6-7 months of age using a playsong and lullaby style of performance. Mothers’ voices were recorded singing a song (of their choice) in one of the two styles – either lullaby or playsong – and then asked to sing the same song with the opposite intent. The audio recordings were played as the mothers sat in front of their infants. Mothers
were asked to respond minimally to their infant, smiling but without vocalisation. Results showed that the infants vocalised more and focused attention more toward themselves during the lullaby-style than during the playsong-style, and in the latter they focused their attention more on the mother. Although there were no significant differences for motoric arousal, rhythmic behaviour or smiling, results indicated that motoric arousal and rhythmic behaviour were higher during the lullaby style, with the authors suggesting that the playsong style was so absorbing of infants’ attention that they largely stopped moving. Rock et al. (1999) concluded that different emotional messages are communicated to the infant by the lullaby and playsong styles of singing, independent of the lyrics.

It could be argued that if infants are only sensitive to the style of singing and lyrics are of no consequence, the intuitive mother is likely to embrace the spontaneous pleasure of adapting songs to suit the caregiving situation, as noted by Trainor et al. (1997). They suggest that mothers are intuitive to their infants’ needs by altering singing styles regardless of the song’s lyrics (Trainor et al., 1997). However, in the case of the first-time mother, the study of Vlismas and Bowes (1999) found that the mothers did not indicate that adapting songs was part of their singing practice with their infants. Of the thirty nine mothers only ten indicated they enjoyed singing. If mothers were provided with a repertoire of songs that encouraged their enjoyment of singing to their infants the mothers’ communicative interactions with their infants may be enhanced.

The discussion on vocal communication has presented evidence to suggest that maternal singing and melodic speech convey affective messages to the infant and can assist the infant’s self-regulation of mood states. Such effects of vocal communication could have positive developmental ramifications for the infant but in addition, these effects could benefit the developing mother-infant relationship. It has been hypothesised that a program of music and movement activities that include songs and rhymes could enhance the first-time mother’s interactions with her infant. Vocal communication however, is only part of the communicative system (as outlined in section 3.1) that mothers use when engaging with their infants. Mothers’ use of gestures when interacting with their infants provides another source of stimulation that enhances the dyadic communicative process. The following section
will provide information on gestural communication and its function in the mother-infant relationship.

3.3 Gestural Communication

Bernardis and Gentilucci (2006) advocate that gestures accompany vocal communication in order to reinforce the message. The sensitive mother’s vocal communication with her infant is accompanied by various types of gestures that accompany her interactions. Dissanayake (2000), Stern (1985) and Sullivan and Horowitz (1983) suggest that maternal gestural communication represents a multimodal form of communication and is exhibited through head and facial movements (such as nodding, smiling, raising eyebrows), hand gestures (such as opening of hands to suggest “it’s all gone”) and touch. Such expressions, according to Dissanayake (2000), are ritualised behaviours which are altered - simplified, stereotyped, repeated, exaggerated and elaborated - and take on a different meaning according to the context. For example, a mother’s actions when singing a lullaby to soothe her infant differ to the actions that accompany a playsong. As previously discussed in section 3.2.3.1 the up-tempo singing of a playsong is usually accompanied with the mothers’ playful, gestural performance that includes various actions of the hands, touch, head movements and facial expressions (Trehub & Trainor, 1998).

Research has been carried out on specific modes of gestural communication during mother-infant interactions. There is evidence that hand gestures reinforce speech by attracting the attention of the listeners and engaging them immediately (Bernardis & Gentilucci, 2006). Iverson, Capirci, Longobardi, and Caselli (1999) studied Italian mothers’ gestures with their 16 month old toddlers and the study was repeated when the toddlers were 20 months. It was thought that during these months of development the toddlers’ use of language would increase and as a consequence change the context in which mothers used gestures. The dyads were videotaped in the home environment during three different contexts: playing with a set of toys provided by the researcher, playing with familiar toys, and during mealtime. The data were collapsed across contexts which did not allow for situational comparisons. The results revealed that maternal gestural production increased over the period of four
months and was coordinated with their speech production. Although some of the gestures these mothers used were reflective of the Italian culture, Iverson et al. (1999) noted that the mothers’ primary use of gestures was *deictic* – meaning the actions of *showing, indicating and pointing* were prominent. These actions occurred with mothers’ use of an object (such as a toy) or the occurrence of an event (such as the gesture specific to the Italian culture of the mother rotating her index finger on the cheek of the child to indicate GOOD). Deictic gestures were also noted to be expressions of mothers’ communicative intent. From the results, Iverson et al. (1999) concluded that mothers’ gestural communication appears primarily to be a means of emphasising emotions during vocal exchanges with their infants (Iverson et al., 1999). So it could well be that the more affective expression in the mother’s voice the more likely she is to be gesturally expressive.

The motion of gestural actions that accompany vocal communication may be another important factor associated with mothers’ communication with their infants. Brand, Baldwin and Ashburn (2002) use the term *motionese* to describe how mothers convey gestural messages to their infants. They suggest that it is not just the use of a gesture that is important as a communicative medium. The motion of the gestural actions is also important. To determine the role of motionese as part of the communicative process, Brand et al. (2002) compared maternal infant-directed motionese and adult-direct motionese. Using five objects not typically used as toys for infants, mothers either interacted with their healthy infants who were aged between 6 and 8 months of age, 11 to 13 months of age, or with an adult with whom they had a close relationship. The observational recordings were rated and results revealed there were no significant differences between mothers’ actions for the two infant age groups across eight types of actions – proximity to partner, interactiveness, enthusiasm, range of motion, repetitiveness, simplification, punctuation and rate. Compared to the adult-directed actions, mothers demonstrated the objects to the infants in closer proximity, with heightened enthusiasm as measured by a higher level of interactiveness, more repetitiveness and movements that were more expressive but simpler in complexity. While the time mothers spent demonstrating to adults was longer, mothers spent more time in joint action with the objects with the infants indicating they could have been more receptive to the infants’ attention cues and less focused on the adults’ attentiveness. Brand et al. (2002) concluded that
actions of mother to infant were characteristically distinctive compared to the adult-directed counterpart. Because of exaggerated characteristics of maternal IDS, mothers matched the motion of their gestures through exaggerated expressions of bodily movement. However, individual differences occurred within the sample of mothers regarding their expressiveness to their infants.

The study (Brand et al., 2000) showed that mothers who displayed high levels of motionese were consistent with their interactions on all objects. Brand et al. (2000) termed these mothers as ‘high’ motionese mothers who chose limited actions with the objects but would use repetition of the actions on each object before proceeding to the next. These mothers would also pause with their actions by gazing at their infant and punctuate the interaction with expressions of surprise and pleasure at infants’ responses. The authors noted that such a style of interaction could facilitate infants’ learning, thereby suggesting it had a didactic function. If this is so, then the high motionese interactive style is more likely to benefit infants’ learning than the less expressive style. In addition, the gestural and vocal interactions of the ‘high’ motionese mothers suggest they could have been acting intuitively, understanding their infants’ needs to be active partners in the playful exchanges, and attuning their actions with those of their infants. For those mothers who do not display ‘high’ motionese, encouragement of their interactive behaviour with their infants may enhance their mutual relationship. Providing first-time mothers with a repertoire of music and movement activities that encourages vocal and multimodal communication with their infants could enhance the mutual behavioural exchanges of the mother-infant dyad.

Infants’ age and mothers’ ID singing could also be factors that determine mothers’ use of hand gesturing. Longi (2003) (cited in Longi and Karmiloff-Smith, 2004) found that when infants were three months old their mothers used synchronous hand gesturing when singing to the infant. At the infants’ age of 7 months, mothers’ interactions during singing involved actions using toys which significantly reduced their direct expressive hand gesturing. Although mothers’ introduction of toys during playful interactions (that does not include singing) with their infant could be developmentally specific according to infants’ age (Trevarthen, 2001) the study of Iverson et al. (1999) showed that mothers’ use of toys did not inhibit gestural
communication that accompanies maternal IDS. Hand gesturing that accompanies mothers’ ID singing could differ however. Limitations of a song repertoire could determine how a mother uses hand gesturing when singing to her infant. In order for mothers to be continually developing their gestural expressiveness during singing interactions, a song repertoire that incorporates hand actions and other gestures could benefit the communicative relationship of mother and infant. Mothers’ use of touch and playful facial expressions may also be of benefit to the infant as indicated by research.

3.3.1 Touch and Facial Expressions
Tronick (1989) suggests that touch can regulate arousal, enhance proximity between mother and infant and organise and soothe the infant but is dependent on the sensitivity of the mother to her infant’s needs. Similarly, Field (2002) suggests that touch may transmit the sensitive caregiver’s perceptions, thoughts and/or feelings to the infant and in turn the infant’s feelings and/or behaviour are regulated. So mothers’ use of sensitive touch with their infants could be an important part of the communicative interactions that assist with infant well-being and affect the mutuality of the dyadic relationship.

Evidence of infants’ responsiveness to touch of non-maternal tactile stimulation was carried out by Pelaez-Nogueras, Gewirtz, Field, Cigales, Malphurs, Clasky and Sanchez (1996) with infants aged 3.5 months. The results showed that during the touch condition of gentle stroking that was administered by the researcher, infants emitted more eye contact, more smiles and vocalisations, and spent less time crying and protesting compared with the no-touch condition. Such results indicate the effects of touch in arousing feelings of positive well-being in infants. A study that supports the notion that mothers’ use of touch by way of massage with their infants positively influences infant mood state was carried out by Field (1995b). Investigating mothers experiencing postnatal depression, results revealed that these mothers use of massage induced drowsiness in the infants which produced more contentment in their mood state prior to sleep. From the results of these studies it appears that sensitive touch improves infants’ responsiveness to their mothers. This responsiveness could in turn affect mothers’ responsiveness to their infants and assist in the development of dyadic reciprocity.
Further results of the study by Field (1995b) showed that the mothers were successful in task accomplishment by massaging their infants which, in turn, could build a positive perception of their competency in the parenting role and facilitate mother-infant bonding. Enhancing mothers’ perception of competency, as an effect of their successful practice of massaging their infants, could also apply to the first-time mother whose sense of self as a parent may not be as developed as more experienced mothers. If mothers’ practice of communicative activities successfully engages their infants, mothers’ sense of themselves in their parenting role could improve as an effect of their interactions – as will be investigated in Study 1.

Infants’ sensitivity to their mothers’ expressive gestural interaction extends to certain facial expressions as shown by Izard, Fantauzzo, Castle, Haynes, Rayias and Putman (1995). As young as 2.5 months infants can respond by smiling in response to mothers’ expressions of interest and joy. Negative expressions of sadness and anger, withdrawal or still face from the mother can elicit grimacing and crying from the infant. Infants’ sensitivity to mothers’ facial expression may not only affect their emotional well-being. It could also contribute to the development of the mutuality of the mother-infant relationship. Pleasurable music and movement activities could promote mothers’ use of joyful and engaging facial expressions when interacting with their infants. Their enjoyment is likely to be partly shown by smiling to their infants, and in turn it is likely the infants will reciprocate positively.

By combining the effects of touch and face-to-face stimulation, studies have revealed that during still-face gazes of the mother with her infant, touch increases the infant’s occurrence of smiles compared to still faced conditions with no touch, where the infant remained expressionless (Stack & Muir, 1990, 1992). Stack and Le Page (1996) tested the reactions of infants who were 5.5 months old to their mothers’ use of touch and facial expressions under four conditions: normal interactions including the face, voice and touch; still-faced with the use of minimal touch; still-faced while touching infant to obtain maximum amount of infant smiling, and; still-face while touching infants on only one area of the body. Results showed that the condition of still-face plus maximum use of touch elicited as much smiling from the infants as the normal interaction condition. These results reinforce the need for mothers use of
sensitive touch with their infants but also that mothers facial expression together with voice and touch are the communicative modes that contribute to what Stack and Le Page (1996) consider as ‘normal’ interactions. If first-time mothers’ use of multimodal gestural communication was encouraged as part of their repertoire of interactions then not only could the frequency of the touch interactions increase (to be investigated in Study 1) but so too could infants’ responsiveness to their mothers’ actions.

This section has presented evidence of the importance of gestural communication in the mother-infant relationship. It appears that infants’ need for consistent sensitive gestural interactions with their mothers is part of the communicative system through which mothers’ emotions are conveyed to their infants. However, a mother’s communicative interactions with her infant are incomplete without the use of rhythmical movement. Mechthild Papoušek (1996) suggests mothers’ use of movement with their infants presents a rhythmic-dynamic form of stimulation that infants require as part of their developmental needs.

### 3.4 Movement Interactions and Their Communicative Functions

Movement interactions that occur as part of the communicative behaviour between mother and infant are essential for the bonding of the dyad from the time of birth (Hatch and Maietta, 1991). The mother needs to be skilled in using the components of space, timing and effort to match her movements to the requirements of her baby. The infant also needs to synchronise to the mother’s tempo and rhythm so that the interaction becomes a mutual involvement. Hatch and Maietta (1991) argue that the use of movement is important to the mother-infant relationship as it connects the dyad by means of a kinaesthetic bond. This means that every level of physiological, developmental and social function of infants and their parents are interrelated by means of mutually shared motion-generated sensory experience. Motion exchanges of mother and infant form the foundation of the quality of their newly forming dyadic relationship (Hatch & Maietta, 1991). While this argument presents a need for the mother and her infant to experience the sense of each others body in motion, various types of movement styles may contribute equally to their developing
relationship by providing many opportunities for the mother to interact with her infant.

Rhythmical movement of rocking/swaying and patting constitutes a large proportion of the observed communicative interactions mothers use with their infants (Hodges, 1996; Koester, Papoušek and Papoušek, 1989). As a function of infant well-being and development, Hodges (1996) argues that the interactions of mother to infant using rhythmical body movement are vital because of the arousal of pleasure for the infant that is associated with these interactions. This occurs as a function of the cerebellum that is directly linked to the limbic system and the stimulation of rhythmical movement triggers a region of the hypothalamus known as the pleasure centre. Because of this, Hodges (1996) believes that infants deprived of rhythmical movement will fail to develop brain pathways that mediate pleasure. If this is so, then the uses of rhythmical types of movements need to be an integral part of mothers’ interactions with their infants.

Hanuš and Mechthild Papoušek and colleagues (Koester, Papoušek & Papoušek, 1989; Papoušek, 1996; Papoušek & Papoušek, 1987; Papoušek & Papoušek, 1995; Papoušek & von Hofacker, 1995; Trehub, 2002) argue that rhythmic behaviour of the mother occurs as an intuitive process where she alters the tempo and type of rhythmical behaviour to meet the needs of the infant. For example, when the sensitive mother is singing a lullaby to her infant, she will sway or gently rock the infant without consciously recognising the actions associated with the singing. The intuitive mother delights in her interactions with her infant and is continually building on her maternal communicative skills through the success of seeing the pleasure in her infant as an effect of the interactions. The counter-argument has been presented, however, that some mothers’ intuitiveness is inhibited. Such mothers could benefit from being encouraged to practice various types of movements which could develop their individualised styles that can be enjoyed with their infants.

Importantly, rhythmical movement interactions of the mother and her infant could be part of the communicative system that enhances dyadic pleasure. Yet there is very little empirical evidence of the functions of rhythmical movement as part of a mother’s communicative repertoire. Study 1 will determine if encouraging first-time
mothers’ use of a variety of music and movement activities that incorporate rhythmical movement could increase the frequency of mothers’ movement interactions with their infants. This study will also determine if providing mothers with a variety of communicative activities supports their development of a repertoire of movement interactions they share with their infant.

For the frequency of movement interactions to increase as an effect of mothers’ encouraged use of communicative activities, it is likely that musical elements would need to be incorporated into the activities. Dissanayake (2000) believes that the synchronising of bodily movement in mother-infant interactions is associated with elements of music and she considers it essential to incorporate singing with movement as they are inseparable (Dissanayake, 2000). As the mother sings to her infant she accompanies her performance with rhythmical movement. Mothers interacting with their infants using rhymes (such as knee jogging rhymes) also engage their infant through rhythmical movement (M. Papoušek, 1996). So, encouraging mothers’ vocal interactions using songs and rhymes could potentially enhance their repertoire of movement interactions and increase the frequency of mothers’ movement interactions with their infants.

A mother dancing with her infant may also be of benefit to the mother-infant relationship. Dancing combined with singing could stimulate pleasure for both mother and infant and enhance the enjoyment of their interactions. Yet while it could be thought that singing and dancing would be part of mothers’ daily practice of activities they share with their infants, it appears not to be so. Concerningly, Mechthild Papoušek (1996) wrote of the decline of parents singing and dancing with their infants probably due to the surplus of background music and the changes of contemporary lifestyles. The Australian study by Vlismas and Bowes (1999) showed some evidence supporting M. Papoušek’s concern. First-time mothers of infants under 6 months of age were surveyed about their enjoyment of music. Of the sample of 39 mothers, 9 reported enjoying the use of music to dance to, 10 reported they enjoyed singing, but more popular was their enjoyment of listening to background music with 16 mothers reporting they listened to it for relaxation and 17 for entertainment around the house. Other results from this study showed that a group of mothers from this sample who received instruction in a music and movement
program with their infants increased their frequency of movement interactions compared to those of the control group. In relation to Study 1 of this dissertation it could thus be predicted that encouraging mothers’ use of music and movement communicative activities will increase the frequency of mothers’ movement interactions with their infants.

Hatch and Maietta (1991) suggest that an important function of teaching mothers the use of movement interactions with their infants is assisting mothers in becoming more aware of their capabilities and provides a richer environment for the development of the infant and ultimately the dyadic relationship. This argument suggests that providing mothers with the opportunity to be supported in a learning environment where interaction skills are taught through demonstration by a program facilitator may benefit them. According to Freeman (2000) the practice of singing and dancing in a group situation produces a sense of belongingness as it serves as a source of social bonding. So it could well be that mothers dancing and singing, and sharing the enjoyment with their infants in a group situation could be of social benefit, uniting mothers and infants as a group. The benefits of mothers being instructed in a group situation with their use of movement and music activities will form part of the investigation of Study 1.

The argument presented in this section suggests that without first-time mothers’ use of movement activities the mother-infant relationship could be missing part of the pleasurable communicative system that assists in the forming of dyadic social and emotional bonding. It appears mothers need to use a variety of movement interactions as part of the communicative system to successfully engage their infants.

3.5 Summary

This chapter has presented the communicative system the sensitive mother uses when engaging with her infant. Through the various combinations of vocal, gestural and movement interactions the sensitive mother conveys positive emotional and social messages to her infant. From repetition of the communicative behavioural repertoires, it is thought that the infant develops a secure sense of well-being and
together the mother and infant relationship becomes mutually supportive and affective.

Parts of this chapter on the affective communicative system mothers use to successfully engage their infants have included discussion of the musical elements associated with communication. In particular was the discussion on maternal melodic speech and singing that convey affective messages, and how rhythmical movement appears to mediate pleasure and assist in the bonding of mother and infant. Music as a means of accompanying movement has also been introduced as a medium that could be associated with enhancing communicative interactions of mothers with young infants. Based on the evidence presented it has been argued that first-time mothers’ communicative interactions with their infants could benefit from the encouraged use of pleasurable communicative activities through music and movement. The practice of these activities could enhance enjoyable communicative interactions. However, further discussion is required to support the role of music as a communicative medium. This will be presented in Chapter 4. Furthermore, Chapter 4 will present a rationale for the development of a music and movement program for first-time mothers with their infants under the age of 6 months based on the evidence presented.
CHAPTER 4

Music and Movement as Communicative Mediums: The Rationale for Developing a Music and Movement Program
This chapter will present the argument that because music and movement are vital communicative mediums in mother-infant interactions, the encouraged practice of movement and music activities could positively enhance both mother’s and infant’s well-being through enhancing the affective dyadic relationship.

Firstly, a discussion about music as a communicative source that conveys expression of emotions will be presented to demonstrate how it could have an effect on the well-being of the mother and infant. However, mothers’ creation of a musical environment to share with their infants also consists of the coordination of rhythmical movement interactions (see section 3.4). The discussion will lead to a rationale for the development of a program that provides first-time mothers with music and movement activities to practice with their infants.

4.1 The Meaning of Music

*Music* is defined by Freeman (2000) as an art of organising sound in significant forms to express ideas and emotions through the elements of rhythm, melody, harmony and timbre. A combination of these elements that constitute the art of music has the power to arouse emotions and move humans to actions (Freeman, 2000). Thus, music is a powerful communicative medium that regulates behaviour. Trehub and Schellenberg (1995) note that the term *music* is conventionally applied to include the art forms such as a Mozart symphony, pop music, atonal compositions, African drumming, folk music of all cultures and improvised music but is also extended to include simple euphonious or harmonious sequences of sound. They suggest that instead of defining *music*, a focus should be placed on factors that make some sounds musical and others unmusical. Accordingly, Trehub and Schellenberg (1995) restrict the notion of musical sounds to ‘humanly produced, non-random sequences of tones or tone combinations that are non-referential’ (p.2). Although this classification excludes the sounds of general speech, Trehub and Schellenberg (1995) include speech in which form predominates over content, this being Infant-Directed Speech (IDS). Similar to music, a mother’s IDS consists of melodic contours, timbre, tempo and rhythm, the combination of which conveys emotion (as previously discussed in section 3.2).
Emotional communication via acoustic signals did not begin with humans playing musical instruments as humans have always communicated emotions via the voice, according to Gabrielsson and Juslin (2003). Emotional expression conveyed through the voice or in an instrumental performance is largely created by the performers’ articulation, timing and intonation (Gabrielsson and Juslin, 2003). When a mother sings to her infant she could be described as a performer of music. Depending on the sensitivity of the mother’s performance, she creates music that is an expression of her emotions. As the listener, the infant’s pleasure of the experience is exhibited by certain behavioural reactions.

Trehub and Trainor (1998) argue that a reciprocal emotional dyadic bond is fostered through mothers’ ‘live’ performances of their singing accompanied by gestural interactions that stimulates the infant responsiveness. A live performance suggests that mothers create a musical performance based on their selection of communicative activities that suit the needs of the caregiving situation. It is through the success of these performances that the mother and infant share pleasure in their interactions which fosters the dyadic bond, according to Trehub and Trainor (1998). Mothers’ use of music activities could therefore be vital to the early development of the mother-infant relationship.

### 4.2 The Use of Music as a Vital Communicative Medium in the Mother-Infant Relationship

“Just as we are born to be linguistic, with the specific language to be learned determined by the culture, so we are born with the means to be responsive to the music of our culture. If music does not confer any survival benefits, why would it be provided for in our neurophysiological structure? Why would it have developed to the point where it is the universal trait of our species?” (Hodges 1996, p. 42-43). These questions provoke Hodges to argue that the human species through the evolutionary process has been predisposed to be musical and that music is part of the survival of the human species because of its elements of rhythm and the modulation of pitch, timbre and dynamics that enable the communication of love and affection. Similar to the evolutionary argument of Hodges (1996), Trainor and Heinmiller
(1998, p.78) argue that because emotional communication is crucial to survival, humans have evolved to understand the messages conveyed in the musical element of speech and singing. Without such musical interactions, we as humans would be deprived of a fundamental source of affective communication.

A musical environment created by the mother produces the communicative effects that are the root of the development of a positive mother-infant relationship according to Hodges (1996). Upon their entrance into the world, newborns are attentive to the melodies and time patterns of their mothers’ emotional performances of melodic speech and song (Trevarthen, 1999). Infants’ responsiveness to this communication produces what Trevarthen (1999) suggests is a part of the infants’ adaptation or self-regulating behaviour that enables a cooperative relationship to develop between mother and infant that complements the infant mood state and is vital to the emotional development of the dyadic relationship. Trehub (2003) suggests that the power of music as a communicative medium may have arisen from humans’ need for social interaction. In the case of the mother and infant as social interactive partners, musical communication is another form of social interaction (Trehub, 2003). So mothers’ practice of this medium could enhance enjoyable social interaction of mother and infant and effectively assist in the development of dyadic reciprocity. Research however has not been carried out to provide evidence for this.

Accepting that musical communication between the mother and infant is jointly shared, Trehub (2003) notes that research has not confirmed whether the musical interactions between the mother and infant are initiated by the mother or if the mother synchronises with the infant’s natural rhythms that in turn arouse her interactions. The theory of Communicative Musicality discussed previously in section 2.2.1 describes the intrinsic musicality of mutual exchanges in the healthy mother-infant relationship with no suggestion of one partner being the dominant leader in the dyadic interactions. Van Egeren and Barratt (2004) suggest it is the lack of infants’ motoric responsiveness in the early postpartum stage which places the onus on adults to initiate the interactions and be responsive to their infants’ needs for the development of the ‘give-and-take’ style of their communicative relationship. For instance, the mother gazes at the infant until he/she makes eye contact which stimulates the mother’s communicative behaviours. The infant’s responsiveness is
then the catalyst for the mother to continue and intensify her communication, engaging her infant and exchanging pleasurable interactions (Van Egeren & Barratt, 2004). Applying this model of mother-infant exchanges to the use of musical activities would suggest that the mother’s effectiveness as a communicator is determined by her ability to read the infant’s cues. This model also indicates that mothers are required to be intuitive to the infants needs and skilled in engaging their infant to provide them with a stimulating communicative environment. The effect that mothers’ musical interactions could have on the development of the mother-infant relationship may primarily be determined by the effectiveness of the mother as a communicator and the infant’s responsiveness.

As discussed in section 2.2.3, certain risk factors can inhibit mothers’ ability to parent intuitively, causing some level of dysfunction in the development of the mother-infant communicative relationship (Papoušek & von Hofacker, 1995). Such maternal inhibition may partly exhibit as a lack of musical activities used as a pleasurable communicative medium with their infants. In addition, there are other factors that could affect parents’ musical interactions.

The first-time mother’s use of music and movement activities with her infant could be inhibited by the lack of repertoire (Vlismas & Bowes, 1999) and has been previously discussed in section 3.4. Furthermore mothers’ own experiences of being sung to and the musical training which they received during childhood could influence the type of musical interaction they have with their infants. Custodero and Johnson-Green (2003) surveyed parents of 4-6 month old infants regarding their musical experiences and musical practices with their infants. The strongest findings showed that parents who were sung to by their own parents (especially by their mothers) musically interacted with their infants more so than other parents who did not recall such memories. Other findings showed that parents who had some music educational experience (such as music lesson or singing in a choir) were more likely to sing and play music with their infants than those without such musical experiences. Parents with singing experience were more likely to sing often to their infants and sing a variety of genres than those who had no singing experience. Parents who played musical instruments were more likely to play an instrument and recorded instrumental music to their infants than other parents. Such findings
according to Custodero and Johnson-Green (2003) show that parents musical experiences, especially their memories of being sung to by their own parents, influence their musical interactions with their infants. So mothers without such memories and mothers who have not experienced the pleasure of attaining some level of musical education may not be as inclined to practice musical activities with their infants. If this is so, then mothers who have not experienced the pleasure of attaining such musical experiences during childhood may not be inclined to practice musical activities with their infants.

From such literature it appears that certain factors can impinge on mothers’ use of music activities with their infants, and if music is vital to the mother-infant relationship as argued by Hodges (1996), Trainor and Heinmiller (1998) and Trevarthen (1999), then the developing dyadic relationship could be deprived of important emotional and social components.

### 4.3 Infants’ Need for a Musical Environment

Evidence has been presented (section 3.2.3.1) that infants are active listeners to their mothers’ singing of playsongs and lullabies, and can discriminate the differing emotional messages conveyed through these distinct musical and performance styles (e.g. Trainor et al. 1997; Trehub & Trainor, 1998; Trehub et al. 1997; Trehub, Trainor & Unyk, 1993; Trehub, Unyk & Trainor et al. 1993). Healthy infants’ physiological responses when listening to singing have also been studied. Shenfield, Trehub and Nakata (2003) tested salivary cortisol levels in 6-month old infants when being sung to by their mothers. Although inconclusive, the results suggest that maternal singing modulates the arousal states of healthy 6-month old infants.

In addition to maternal singing, listening to non-maternal singing has been shown to have an affect on premature infants’ physiological responses. Cassidy and Standley (1996) studied low birth weight premature infants of 24-30 week gestation to determine the effect of listening to recorded singing of lullabies (sung by a female vocalist with orchestral accompaniment). Those infants who experienced the music listening condition over a period of 3 days showed a higher oxygen saturation levels, improved heart rate and respiration during the first day of exposure compared with
the following days. Infants not exposed to the music did not show signs of these positive changes. Cassidy and Standley’s (1996) conclusion was speculative - that it was likely to some degree that the music relaxed and comforted these neonates. Further evidence of the effects of music on infants’ development in a Neonatal Intensive Care Unit (NICU) was presented by the study of Coleman, Pratt, Stoddard, Gerstmann, and Abel (1997). Of sixty six infants studied, half were exposed for 4 days to three randomly ordered 20-minute segments of auditory stimulation consisting of males and females singing lullabies, versus males and females speaking lullabies, versus ambient NICU sounds. The infants exposed to music left the NICU 3 days earlier than the control group and showed significantly higher caloric intake and weight gain. Infants responded equally to male and female voices.

Accordingly, it appears that infants’ emotions can be both aroused and calmed by listening to singing and could contribute to their emotional and physical well-being. Furthermore, Trevarthen (2005) proposes that music of voices and that of instruments attracts infants’ interest, stimulates pleasure and provokes their movement. He describes young infants’ movement responses to music as ‘dance’ because of their ability to rhythmically coordinate their arms and legs to music. So without musical input, infants’ pleasure of rhythmical movement could be diminished.

Young infants appear to have an innate musical sense as has been shown in studies of young infants’ listening preferences for consonant and dissonant music (Trainor & Heinmiller, 1998; Zentner & Kagan, 1998). Consonance and dissonance refer to the subjective judgement of a listener exposed to two or more frequencies occurring simultaneously (Zentner & Kagan, 1998). Consonant intervals are those that sound smooth and pleasant, while those that sound unpleasant and rough are dissonant intervals. Two experiments by Trainor and Heinmiller (1998) were carried out with 6-month old infants. Firstly, infants listened to consonant and dissonant intervals created by piano timbre. By measuring the infants’ looking time at visual stimuli during the listening experiences, results showed the infants could discriminate consonant and dissonant intervals, and like adults, preferred the consonant sounds. Secondly, when played a consonant and dissonant version of a Mozart minuet in C major, infants discriminated the versions, again showing listening preference for the
consonant piece. While this study shows infants have listening preference for smooth, pleasant music it tells nothing of infants’ emotional responsiveness to such music.

More important for the support of music serving as a vital function in the regulation of infants’ mood states is the study by Zentner and Kagan (1998). Using consonant and dissonant versions of two central European folk songs, results showed that 4-month old infants looked significantly longer at the sound source stimulus when the consonant melody was played and they displayed less motor activity (measured through arm and leg movement) compared to the dissonant melody. Motor activity in infants reflects arousal, indicating either their pleasure or distress according Zentner and Kagan (1998). The fact that the infants of their study showed increased motor activity, together with shorter looking time and increased fretting/turn away behaviour during the dissonant melodies suggests infants were showing signs of distress. Zentner and Kagan (1998) concluded that the results suggest infants may be born with a biological preparedness that makes consonance perceptually more pleasing than dissonance. Not only do infants respond to the affective qualities of the mother’s voice but it appears they are able to show positive behavioural responsiveness to pleasant sounding consonant music.

Musical elements seem to be a powerful communicative medium for infants as active listeners. As discussed in section 4.1, music has the power to evoke emotions and behavioural actions. If mothers are not providing their infants with a musically stimulating environment, the communicative pathway from which the infants experience pleasure and the love and affection of their mother may be narrow. It could also be argued that musical elements may elicit behaviours in infants that promote their well-being. Equally, the stimulation of a musical environment could promote mothers’ well-being.

4.4 Mothers’ Need for a Musical Environment

To determine how listening to music affected emotions, Sloboda (1991) carried out a study that investigated adults’ physical reactions to listening experiences of nominated pieces of music. Mixed genres of pieces were used (classical vocal,
popular vocal, classical instrumental, popular instrumental). The most frequent reported reactions were shivers down the spine, laughter, lump in the throat and tears. Sloboda (1991) suggests that these responses are part of the innate autonomic response system of all adult human beings. Importantly, Sloboda (1991) argues that the emotional response to a piece of music can increase during repeated exposure to the same piece as the individual discovers more about the subtle structure of the music. According to some of the participants’ reports in this study, listening to music evoked an intense emotional response rarely experienced in everyday life with beneficial consequences for motivation and self-image. Such benefits to the well-being of these adults could also apply to mothers who listen to music and enjoy it as part of their daily care routine with their infants. The playing or singing of particular pieces of music could evoke positive emotions, up-lifting mothers’ moods and perhaps motivating them to be active partners with their infants. The success of positively engaging their infant using music could affect maternal well-being in a similar way to a vicarious experience, as presented in the theory of self-efficacy (Bandura, 1977) (see section 1.3.1). A mother’s sense of competence could be positively affected by the success of her musical interactions.

While research on the effects of mothers’ use of recorded music with infants is limited, there is some evidence that suggests it may be beneficial. In the study of Vlismas and Bowes (1999) a variety of recorded instrumental pieces of music was provided to first-time mothers with infants under 6 months of age. The results showed that these mothers significantly increased their use of music for relaxation with their infants compared to the control group. Although the study suggested that mothers’ use of music with their infant assisted in some aspects of maternal well-being and the dyadic relationship, there were no behavioural measures employed to determine such effects.

Further speculation that mothers’ musical interactions with their infants may benefit maternal well-being is presented by Trehub and Schellenberg (1995). They suggest that when the mother sings to her infant, she creates a performance that may be equally as satisfying to herself as it is for the infant because she is expressing (and possibly also releasing) her emotions during her performance. For example, the singing of a lullaby may soothe both the infant and the mother, and the up-beat
tempo of a playsong performance may invigorate a mother’s mood as well as her infant’s. Singing to her infant could also ease the burdens associated with child care. Trehub and Trainor (1998) argue that from the studies of different cultures, the singing of songs has functioned partly as a release of the physical burdens of work. Child care is tiring work for mothers and can be the cause of much physical stress which can also lead to emotional distress. Thus, because singing eases the stress of caring for infants (Trehub & Trainor, 1998) and releases emotions (Trehub & Schellenberg 1995), mothers’ singing may promote positive feelings of emotional wellbeing for both mother and infant.

Custodero, Britto and Brooks-Gunn (2003) investigated parents’ emotional stress and its association with the frequency of their use of music (such as singing and listening to music) with their children aged from birth to three years. They reported that of 2000 parents surveyed, those with no depressive/distressed symptoms were more likely to sing/play to their children daily compared to parents who reported some emotional distress. While this study’s report is valuable regarding the relationship between parents’ emotional state and the frequency of their use of music with their children, it does not show a causative relationship – that is, if the practice of music with their children affects parents’ emotional well-being. Research is required to determine if this is so.

4.5 The Rationale for Developing a Music and Movement Program for First-Time Mothers and Their Infants Under Six Months of Age

To this point, much evidence has been presented that suggests the communicative effects of music and movement are essential for the development of an affective and social mother-infant relationship. However, difficulty arises in being able to directly support such suggestions. There is no substantial evidence from research that has been able to identify how mothers’ musical practices affect the dyadic relationship and to justify encouraging mothers’ communicative interactions with their infants using music and movement. In order to lay the foundations for the experimental investigations on the effects of first-time mothers’ use of music and movement activities with their infants it is necessary to summarise the literature and clarify the arguments presented so far.
4.5.1 What the Literature has Presented

The mother plays an essential role in creating an environment that nurtures her infant’s development. In particular, the mother needs to create a sensitive and affective social environment to stimulate infants’ desire to communicate (as discussed in section 2.1). Through the intimacy of their communicative interactions a companionable partnership is formed.

Three types of communicative processes (voice, gestures and movement) are used by mothers to successfully engage their infants (section 3.1). Characteristics of mothers’ vocal communication were detailed with evidence suggesting infants prefer their sensitive mothers’ infant-directed speech and singing over that of other adults (as discussed in the sub-sections of 3.2). Sensitive maternal speech and singing can enhance infants’ attentiveness, or soothe the infant, and promote a positive affective state between mother and infant (Trehub & Trainor, 1998). It appears that infants prefer maternal singing over maternal speech (Nakata & Trehub, 2004). To satisfy infants’ emotional needs it has been hypothesised that mothers need to incorporate singing to their infants into their communicative repertoire.

Gestures of facial expressions, hand motions and touch accentuate the emotions associated with mothers’ vocal communication (discussed in section 3.3). To accompany their singing, mothers use both gestures and rhythmical movement. Rhythmical movement seems to occur as an intuitive process that accompanies a sensitive mother’s singing (Dissanayake, 2000; Koester, Papoušek & Papoušek, 1989; M. Papoušek, 1996; Papoušek & Papoušek, 1987; Papoušek & Papoušek, 1995; Papoušek & von Hofacker, 1995; Trehub, 2002). Dancing with their infants appears also to be a practice that mothers have enjoyed with their infants, but such enjoyment may not now be frequently practiced (M. Papoušek, 1996; Vlismas & Bowes, 1999). Furthermore, if mothers do not sing to their infants, then gestural communication will occur less as will rhythmical movement (discussed in section 3.4). Without music and movement interactions, the mother-infant relationship is likely to be depleted of the basic human needs of love, affection and pleasure (Hodges, 1996).
Mothers’ repeated practice of specific musical activities could also be associated with the positive development of the mother-infant relationship. Papousek and Papousek (1987) suggest the repetition of mothers’ musical actions provides infants with a predictable and secure environment. It was discussed in section 3.2.3 that mothers singing of certain songs during particular caregiving routines during the day could be comforting for the infant (Bergeson & Trehub, 2002). Providing mothers with musical activities to be incorporated into the constant caregiving routines may not only encourage the mothers’ interactions through certain songs and rhymes associated with the tasks, but could also establish predictability for the infant. Examples of such activities could be a specific piece of music used for dancing to induce relaxation, songs at bath-time, tickling rhymes when changing the baby and lullabies accompanied by rocking at sleep-time. This form of scaffolding the infant’s day-to-day activities through repetition may also become an important inclusion in the communicative interactions of the mother with her infant, and may be important for the infant’s overall development. The mother creates a secure, predictable environment using enjoyable musical interactions. The infant in return is responsive to the mother’s interactions, thus building on the dyadic mutuality.

Mothers’ music and movement interactions with their infants have been presented as necessary for the well-being of the infants and the dyadic relationship. It is thought that mothers’ practice of musical interactions fosters a dyadic bond (Trehub & Trainor, 1998) and is the root to the development of a positive mother-infant relationship (Trevarthen 1999). However, there are no empirical studies that specifically address these questions. Nor have there been specific studies into first-time mothers’ use of music and movement with their infants.

The effects that first-time mothers’ use of music and movement activities have on the developing relationship with their infants and maternal well-being needs to be investigated to provide evidence on the value of such activities and whether this practice needs to be promoted. The literature (discussed in section 1.2) notes that the early post-partum months of the transition to motherhood can represent a difficult period for first-time mothers in adjusting to the seemingly overwhelming responsibilities of caring for their infants. Specific risk-factors such as maternal mood state, infant temperament and social support can hinder mothers’ competence
and sensitivity as the primary caregiver (discussed in section 1.3). Feelings of anxiety concerning her ability to parent could also inhibit the first-time mother to engage with her infant using pleasurable communicative interactions that are required for dyadic synchrony and development of a reciprocal relationship (Papoušek & Papoušek, 1987). Because of the lack of research evidence there is uncertainty of the frequency that first-time mothers in the early postpartum months are actually engaging their infants with pleasurable music and movement activities. Evidence has however been presented in section 3.2.3.1 that first-time mothers could have a limited repertoire of music activities they practice with their infants (Vlismas & Bowes, 1999), limiting the dyadic communicative interactions.

To investigate the effects of encouraging first-time mothers’ use of music and movement activities with their infants, a program has been devised.

### 4.5.2 The Development of a Music and Movement Program

To overcome the effects that certain risk factors can have on mothers in their caregiving role, intervention programs have shown that heightening parental awareness of infant needs and their own qualities as the primary caregiver can enhance sensitive caregiving and thereby interactional synchrony of the dyad (as discussed in section 1.3.2.1). The successful outcome of intervention programs can also be reliant on the type of implementation method. From the intervention programs reviewed in section 1.3.2.1, encouragement using a modeling/coaching method facilitated by persons with specific knowledge and skills appears to have more significant outcomes on the development of mothers’ caregiving skills and infant development than other methods. Regarding the use of music as an intervention, within Australia there have been music therapy programs designed for family group participation that have attempted to encourage parents’ creative expression with their developmentally delayed children (Shoemark, 1996) and to strengthen parent-child interactions of marginalised families who have suffered from trauma (Abad & Edwards, 2004). The anecdotal observations of the facilitators and self-report evaluations showed that parents benefited from participation, however there were no scientific methods employed to clarify the specific benefits to the parents and their children.
Criticism of music programs devised for parents of infants has been expressed by Trehub (2002). She suggests that deliberate, planned performances by mothers participating in an intervention program are unlikely to carry the emotional richness of spontaneous performances. While this point may have some validity, some mothers may need the guidance of a specifically designed program that provides a variety of resources and encouragement of their uses. Depending on the support of the learning environment and the content of the program, mothers could be stimulated to enrich their family and their communicative relationship with their infant through the practice of music and movement activities, leading to their own spontaneously produced music and movement activities. Trehub’s argument falls back to the notion that mothers musical interactions are intuitive, “Unlike musical mentoring by professionals, maternal mentoring is intuitive and selfless, guided by love and concern for infants rather than profit or musical goals. If infants are musical, then surely mothers are, too” (Trehub 2002, p.22). The argument of intuitive parenting has been discussed in chapters 2 and 3, providing reasoning as to why the first-time mother’s intuitive communication with her infant could be inhibited. The last point of Trehub’s quote – *If infants are musical, then surely mothers are, too* – has no relevance to mothers being effective in their communicative interactions with their infants. Despite Trehub’s (2002) criticism of mothers’ participation in music programs with their infants, there has been much evidence presented throughout this discussion that supports the proposition that first-time mothers may well benefit from the encouraged use of music and movement activities with their infants.

4.6 Considering the Content of a Music and Movement Program

Music and movement have been presented as emotional and social communicative mediums that are used jointly when mothers engage with their infants (Dissanayake, 2000; Longi & Karmiloff-Smith, 2004; Mechthild Papoušek, 1996). Associated with mothers’ use of music and movement activities is gestural communication that supports interactions and reinforces mothers’ social and emotional messages (as discussed previously in section 3.3). A program devised to enhance mothers’ communicative interactions with their infants will therefore need to incorporate activities that provide the opportunity for mothers’ expressive use of vocal, gestural
and movement expressions. Songs, rhymes, musical games, instrumental music for dance and relaxation may be included in such a program.

If the mothers are to engage successfully with their infants throughout the day by using the activities, they will require a recording of the songs, rhymes and instrumental music. However, concerns for the use of recorded music within the caregiving environment have been raised, suggesting that such music cannot sufficiently support the development of musicality (Hanuš Papoušek, 1996) and that it is no substitute for a mother’s live performance with her infant (Trehub & Trainor, 1998). Acknowledging the limitation that the sole use of recorded music may have on mothers’ communicative interactions with their infants is important. Thus, the use of recorded music could partly contribute to some of the music and movement interactions the mother and her infant enjoy. Recordings of songs and rhymes could assist the mothers initially to learn lyrics as well as provide them with an auditory model for exploring the creative use of their voice. As the mothers become confident with their use of the activities, the repertoire of songs and rhymes could be used spontaneously throughout the day with their infants (without the recorded version). Mothers’ practice of improvisation by adapting the activities to suit the caregiving situation is also to be encouraged as not only does it avoid habituation and maintain infants’ level of arousal (Stern, 2000) but it provides mothers with the opportunity for creative input.

These resources could also equip the mothers to build on their repertoire and adapt activities that can be applied to the developing dyadic relationship and to their family context.

4.6.1. Playsong and Lullabies, Rhymes and Musical Games
Research discussed in section 2.2.2 showed that mother-infant affect attunement was most prominent during interactions of playfulness compared to other types of behavioural actions. Playsongs, rhymes and musical games motivate mothers to interact with their infants for the purpose of having fun and to communicate joyful emotions (Trainor et al. 1997). Playful behaviour, as argued by Hanuš Papoušek (1996), motivates humans to be spontaneous and creative. Through the use of these activities musical elements of melody, rhythm and bodily movements and vocal
timbre are explored (H. Papoušek, 1996). The varying combination of these elements could also give the mother the creative freedom for developing her individual performance style that she finds successful in joyfully stimulating her infant (Trehub & Trainor, 1998).

Singing playsongs can incorporate mothers’ gestural use of hands and facial expressions and rhythmical movements can arouse infants’ joyful reactions while promoting pleasurable emotional exchanges between the mother and infant (Trainor & Trehub, 1998). Playsongs can also incorporate mothers’ dancing with their infants. The reciting of rhymes presents the opportunity for mothers’ variations of rhythmical movements with their infants. The wording and phrasing of both rhymes and playsongs allows for accentuation of the beat through hand clapping or knee jogging and the use of pausing, stimulating infants’ desire to partner their mothers.

Musical games of peek-a-boo and tickling rhymes are particularly important for mothers’ emotional communication. According to Mechthild Papoušek (1996), they characterise an interactional sequence that stimulates a positive mood state in the infant. In particular, the inclusion of tickling rhymes incorporates mothers’ playfulness through the stimulation of touch and facial expressions. Mechthild Papoušek (1996) describes the performance sequence that is typical of mothers’ playful musical games. Firstly, a fast-beat rising vocal melody crescendos and the tempo accelerates which is attention-getting for the infant. Then, the performance reaches a climax with a tension-eliciting pause in the melody followed by a falling melody and a slowing of the tempo which brings about mutual relaxation at the conclusion of the performance (M. Papousek, 1996).

In contrast to arousing playful interactions is a quiet, calm environment that is created by the singing of a lullaby, accompanied by gentle rocking movements. Emotions of affection and tenderness that are associated with the singing of a lullaby (Trehub & Nakata, 2002) could also be accentuated by the accompaniment of mothers’ use of sensitive touch (Field, 2002; Tronick, 1989).

4.6.2 Pop and Classical, Instrumental and Vocal Genres
Based on the findings of the studies by Sloboda (1991) and Vlismas and Bowes (1999) discussed in section 4.4, the argument was presented that the playing of particular pieces of music could evoke positive moods and motivate mothers to be active partners with their infants. Evidence was presented in section 4.3 that infants show more relaxed motor activity during listening to consonant music compared to dissonant music. So consonant music in mixed genres of songs (love songs, popular ballads, classical) and instrumental pieces (popular and classical) could provide infants with pleasurable listening experiences as well as providing the mothers with the opportunity for creative emotional expression through singing and dancing and sharing enjoyable times with their infants.

### 4.7 The Music and Movement (M&M) Program

Based on the literature which has outlined the rationale for including playsongs and lullabies, rhymes and musical games (section 4.6.1) and recorded music of pop, classical, instrumental and vocal genres (section 4.6.2) the M&M program content\(^3\) was devised and integrated into five main topics which consisted of specific components of activities for mothers to engage with their infants. These topics and components are as follows:

1. **Relaxation and dance with your infant**
   This consisted of 3 components (i) Establishing relaxation methods using music, (ii) Using touch and facial expressions to stimulate your baby, and (iii) Developing rhythmic movement to music.

2. **Introducing rhymes and songs**
   This consisted of (i) Singing nursery rhymes and lullabies, and (ii) Further exploration with movement and relaxation

3. **Clapping, tickling and knee jogging rhymes**

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\(^3\) Appendix 1 - The descriptive content of the M&M program
This consisted of (i) Exploring ‘the beat’ and vocal expression, (ii) Tickly rhymes, touch and facial expressions, (iii) Fun through movement - knee jogging rhymes and songs, and (iv) Improvisation and rhymes

4. Musical games to play with your baby
This included (i) Toys as musical instruments, (ii) Peek-a-boo games, and (iii) Songs for everyday happenings

5. Evoking mood using music and movement,
This included (i) Using music to evoke different moods (ii) Let’s dance, and (iii) Let’s relax

The rationale for the order of presenting the M&M program topics was based on creating an optimum learning environment that fostered the mothers’ enjoyment of using the activities with their infants in a group situation. Factors that could inhibit the mothers’ enjoyment of participation were considered – these being mothers feeling self-conscious when singing and dancing in a group situation and any lack of rapport among the group participants and the researcher.

Topic 1 Relaxation and dance with your infant was presented first as a way of easing the mothers into the program and the group setting by using the passive activities associated with relaxation using touch and gentle rhythmical movements to slow tempo music. Topic 2 Introducing rhymes and songs introduced singing and dancing in a group setting by using a traditional repertoire of nursery rhymes and lullabies that could be familiar to the mothers, thus building the mothers’ confidence. With the expectation that mothers would have begun feeling at ease in the group setting by Week 3 of the program, Topic 3 Clapping, tickling and knee jogging presented mothers with the opportunity to explore their use of vocal prosody and rhythmical movement with their infants using playful activities. Mothers’ creativity through improvisation was also encouraged. Topic 4, Musical games to play with your baby extended on mothers’ playfulness with their infants incorporating games, songs and dance that could be integrated into daily aspects of the care routine. Topic 5, Evoking mood using music and movement presented various genres of recorded music that
might inspire mothers to further explore various types of dance movements that they could enjoy using with their infants.

The procedures for implementing the M&M program are discussed in section 5.3.3. Reference will be made to Appendices 2 and 3 which are the program guides given to the Music and Movement participants.

4.8 Summary

This chapter has presented the argument that music is a vital communicative medium for the developing mother-infant relationship. It appears that a mother’s love and affection for her infant can be conveyed through musical interactions (Hodges, 1996). In addition, it has been suggested that musical interactions of the mother and her infant are synchronous with movement interactions and are part of the communicative system that enhances enjoyable social dyadic interactions (Trehub, 2003).

In the case of the first-time mother who may not be as intuitive as more experienced mothers to the communicative needs of her young infant, and who may experience greater stress and anxiety in her mothering role, encouragement of music and movement activities could assist. As important as music and movement may be to the developing mother-infant relationship, there is no empirical evidence that supports these suggestions.

Study 1 of this dissertation will investigate if first-time mothers’ encouraged use of music and movement activities increases the frequency of interactions with their infants and if certain activities are used more often than others when engaging with their infants. Mothers’ well-being as an outcome of their practice will also be investigated. Furthermore, whether these outcomes vary according to the program’s implementation methods will be explored.
Study 2 will investigate if first-time mothers’ encouraged use of music and movement activities affects the quality of their communicative interactions with their infants. In particular, the effects of music and movement on mothers’ Infant-Directed Speech (IDS) and dyadic behaviour will be investigated.
CHAPTER 5

STUDY 1

The Effects of Music and Movement and Face-to-Face Contact on Mothers’ Ratings of Maternal Well-being and on Mother-Infant Interactions
5.1 Background and Design

5.1.1 Introduction
Study 1 was designed to investigate the effect of first-time mothers’ use of music and movement (M&M) activities over a 5-week period on (i) the frequency of communicative interactions with their infants aged 2-6 months, (ii) maternal well-being and (iii) the evaluation of the music and movement (M&M) program. To determine the efficacy of the M&M activities, the influence of potentially confounding factors was considered.

The method of implementing M&M activities was considered as a possible confound. Face-to-face (F2F) social contact was investigated as a factor (both independent of M&M, and its interaction effect with M&M) that could influence mothers’ communicative interactions with their infants and maternal well-being. Based on the theory of self-efficacy (Bandura, 1977, 1989, 1997), evidence shows that social support can influence mothers’ caregiving practices (see sections 1.3.1 & 1.3.1.2). Accordingly, a face-to-face instruction method of encouraging mothers’ interactions with their infant through modelling/coaching and social contact with other first-time mothers could, in itself, have a beneficial effect on the development of mother-infant interactions and mothers’ well-being. Additionally a no F2F contact M&M procedure was developed, a method for self-instruction of M&M (without the face-to-face contact of group facilitation), but with the same content as the F2F M&M program.

5.1.2 Design
A 2 x 2 x (2) mixed between-within subjects design was employed. Time (pre-test vs post-test) was the within-subjects independent variable. Music and Movement (M&M, present or absent) and Face-to-Face contact (F2F, present or absent) were both between-subjects independent variables. Thus there were four participant groups were formed by the factorial combination of M&M/No M&M and F2F contact/No F2F contact. Two types of M&M groups (face-to-face instruction method and self-instruction method) and two groups without M&M were tested. The two groups without the M&M (F2F-Only and the No Treatment group) were devised to control for the effects of M&M over the 5 week period. If mothers do intuitively
interact with their infants using music and movement activities as discussed in section 4.5.2 (without the input of a mother-infant program) and if an increase of these interactions naturally occurs over this time then results of the F2F-Only and the No Treatment group will reflect this. Also, these two groups will control for the infants’ development that may influence mothers’ communicative interactions with their infants over the 5-week period (discussed previously in section 2.1.2). As a result of their development over this time period, infants could increase their ability to partner their mothers during interactions. Specific behaviours such as the infants’ increased gaze/focus on the mothers during face-to-face interactions, together with smiling and vocal interactions such as giggling and cooing could influence mothers’ motivation to interact with their infants.

Details of these groups are set out below and further details are discussed in sections 5.3.2.3 and 5.3.3.

1. *Music & Movement / Face-to-Face contact (M&M-F2F)*
   
   The M&M-F2F group instruction was facilitated by the researcher. Mothers and their infants met weekly over a 5-week period for small group participation of the M&M program. Mothers were also given an audio-tape of the music to use at home over the 5-week period.

2. *Music & Movement / No Face-to-Face contact (M&M-Only)*
   
   M&M-Only group participants received the self-instruction method of the M&M program which was referred to as M&M-SI (self-instruction) program. It consisted of written information and instructions on the music and rhythmic movement activities, and an audio-tape of the music for use over a 5-week period. The researcher had weekly phone contact with these mothers (of approximately 10-15 minutes) to ensure their progress through the activities.

3. *No Music & Movement / Face-to-Face contact (F2F-Only)*
   
   F2F-Only group participated in the Play and Chat (P&C) program facilitated by the researcher. Mothers and their infants met weekly over a 5-week period to participate

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4 Appendix 2 The M&M-F2F program – ‘Music CD 1’ and program guide.
5 Appendix 3 The M&M-SI program – ‘Music CD 2’ and program guide.
in a program that incorporated information on infant development and appropriate
dyadic play interactions (without music and movement), and provided mothers with
the social opportunity to discuss experiences/issues associated with early parenting⁶.

4. No Music & Movement / No contact (No Treatment Control)
No Treatment Control (Control) group participants were not involved in any
program associated with this study, nor did they have contact with the researcher
during the 5-week control period

5.2 Research Aims, Specific Questions and Predictions

5.2.1 Aim 1
To determine the effects of Music and Movement (M&M) and Face-to-Face
(F2F) contact on the frequency of mothers’ interactions with their infants.

Three questions were formulated.
1. Does M&M increase the frequency of mothers’ interactions with their infants over
a 5-week period, independent of the effects of F2F contact?
2. Does F2F contact (with the program facilitator and other mother-infant pairs)
increase the frequency of mothers’ interactions with their infants over a 5-week
period, independent of the effects of M&M?
3. Is there interaction of F2F contact and M&M? Hence, does F2F contact with the
M&M mothers have a greater effect on increasing the frequency of interactions with
their infants than the effect of F2F contact in the no M&M groups?

5.2.1.1 Predictions
Question 1
It was predicted that the frequency of mothers’ interactions with their infants would
increase over time regardless of group because as infants develop, their
responsiveness to communicative and other environmental stimuli increases which
cues the mothers to increase their interactive participation (Schore, 1994, 2003a,
2003b). However, over and above this, the practice of the M&M activities should
significantly increase the frequency of mothers’ interactions with their infants

⁶ Appendix 4 The Play and Chat program
compared to mothers not practicing the M&M activities, due to the communicative effects associated with music and movement (see section 4.5.1).

Question 2
It was predicted that F2F contact would have an effect on mothers’ interactions with their infant, with results showing mothers participating in a F2F program would increase their interactions significantly over the mothers not having F2F contact.

Question 3
It was predicted that F2F contact would interact with M&M, such that the effect of F2F vs no-F2F would be greater in the two M&M groups (M&M-Only vs M&M F2F) in the two No M&M groups (Control vs F2F-Only).

5.2.2 Aim 2
To determine the effects of M&M and F2F contact on maternal well-being.
Maternal well-being was measured by The Maternal Attitudes Questionnaire, Parenting Stress Index/Short Form and Maternal Post-Natal Attachment scale (detailed in section 5.3.7). As for Aim 1, the independent variable of M&M and F2F contact and their interaction effect on maternal well-being were investigated. Three questioned were formulated.
1. Does M&M improve mothers’ well-being over a 5-week period, independent of the effects of F2F contact?
2. Does F2F contact improve mothers’ well-being over a 5-week period, independent of the effects of M&M?
3. Is there interaction of F2F contact and M&M? Hence, does F2F contact with the M&M mothers have a greater effect on improving their well-being than the effect of F2F contact in the no M&M groups?

5.2.2.1 Predictions
Independent of the above questions, it was predicted that over the five week period the measures of maternal well-being would show improvement in all four groups because of the mothers adapting to their parenting role. Over and above this prediction, are specific predictions pertaining to the questions.
Question 1
It was predicted that mothers’ practice of M&M would have a significant positive effect on improving their well-being when compared with those who did not take part in M&M.

Question 2
It was predicted that mothers receiving F2F contact would show greater improvement in maternal well-being than those not having F2F contact.

Question 3
It was predicted that the combined effect of F2F contact and M&M (in the M&M F2F group) would be greater than the additive effects of F2F contact and M&M alone.

5.2.3 Aim 3
To assess the M&M-F2F and M&M-Only groups’ evaluations of the M&M program.

Three questions were formulated:
1. What are the benefits of participation in the M&M program for the mothers in their parenting role and the relationship with their infants?
2. Are there specific aspects of the M&M program (compared to the entire program) that mothers regard as beneficial when engaging with their infants?
3. Did the program evaluation results of the M&M-F2F group differ to those of the M&M-Only group?

5.2.3.1 Predictions

Question 1
It was predicted that mothers in both groups would report that the M&M program increased their enjoyment of interactions with their infants and increased their repertoire of M&M activities (see Vlismas & Bowes, 1999).

Question 2
It was predicted that up-tempo M&M activities that promote fun between the mother and infant were likely to be practiced more than other activities, as the dominant type of behaviour that mothers’ attune to with their infants are happy, playful rhythmical actions (Jonsson & Clinton, 2006) (see section 2.2.2)
Question 3
While it was predicted that both M&M groups would increase their repertoire of M&M activities to use with their infants, mothers of the M&M-F2F group would show a greater increase over time in their use of the M&M activities over the M&M-Only group due to the social contact with the researcher and peer influence motivating their interactions. In addition, the M&M-F2F group would report the benefit of participation as broadening their social network with other first-time mothers and their infants.

5.2.4 Implicit Assumptions
Based on the literature and previous research that has been reviewed implicit assumptions for Study 1 have been made.
1. (a) Mothers may not be interacting with their infants using music and movement, as a traditional caregiving practice (M. Papousek, 1996; Vlismas & Bowes, 1999).
1. (b) Modern mothers may need to be educated about the importance of engaging with their infants using music and movement activities (Vlismas & Bowes, 1999).
1. (c) If mothers do in fact practice music and movement activities as part of the caregiving routine the M&M program of instructions will further enhance mothers’ existing interactive behaviour with their infants.
2. The subjective reports of mothers are reliable and translate into (a) actual behaviour and (b) effect the infant and the infant-mother relationship.
3. The sustaining effects of M&M (increases/decreases) on mothers’ interactions with their infants is difficult to determine without a long-term follow-up study.

5.3 Method
5.3.1 Participants
Ninety six first-time mothers (Mean age = 31.62 years, $SD = 4.0$, Range = 22-43 years) and their infants aged from two to six months (Mean age = 3.3 months, $SD = 1.0$, Range = 2-5.5 months) formed the sample for Study 1. One hundred and two mothers were recruited. However as this was a normative study, 6 mothers’ data

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7 It was necessary for infants to be no older than six months as the M&M program was devised specifically for mother-infant interactions within the first six months. The minimum age was two months because it was necessary for infants to be active communicative partners with their mothers. Infants of this age have been shown to actively engage using coordinated facial and vocal actions oriented to their mothers in face-to-face interactions (Lavelli & Fogel, 2002).
were not included, as pretest screening showed they were within risk categories for postnatal depression.

Mother-infant dyads were randomly placed into one of four groups of 24. There were no significant differences between ages for mothers or infants between the groups, and sex representation of infants was approximately equal in each group. With the exception of four infants who were premature (4-5 weeks) all infants were born within two weeks either side of full-term (that is between 38 and 42 weeks). All mothers reported their infants be healthy and achieving normal developmental milestones for their birth age. A summary of mother and infant ages and the sex of the infants according to the 4 groups of 24 are shown below in Table 5.1

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mothers’ Age (years)</th>
<th>Infants’ Age (months)</th>
<th>Sex of Infants: number of boys and girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music &amp; Movement – Face-to-Face</td>
<td>32.08 (SD = 4.35)</td>
<td>3.08 (SD = 0.82)</td>
<td>Boys = 13</td>
</tr>
<tr>
<td>(M&amp;M-F2F)</td>
<td></td>
<td></td>
<td>Girls = 11</td>
</tr>
<tr>
<td>Music &amp; Movement – Self Instruction</td>
<td>31.83 (SD = 4.66)</td>
<td>3.25 (SD = 1.16)</td>
<td>Boys = 12</td>
</tr>
<tr>
<td>(M&amp;M-Only)</td>
<td></td>
<td></td>
<td>Girls = 12</td>
</tr>
<tr>
<td>Play &amp; Chat Face-to-Face</td>
<td>31.37 (SD = 3.53)</td>
<td>3.81 (SD = 1.07)</td>
<td>Boys = 13</td>
</tr>
<tr>
<td>F2F-Only</td>
<td></td>
<td></td>
<td>Girls = 11</td>
</tr>
<tr>
<td>No Treatment (Control)</td>
<td>31.20 (SD = 3.86)</td>
<td>3.16 (SD = 0.78)</td>
<td>Boys = 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Girls = 14</td>
</tr>
</tbody>
</table>

The sample of mothers represented middle-class socio-economic status. Ninety mothers had attained tertiary education either at university or at TAFE and six had gained professional positions through work experience. Except for two mothers, all mothers were on maternity leave from their employment during their participation in the research. Ninety-four were married and two cohabiting with their partners. Beyond the support of their partner, all mothers reported having the support of family and friends. English was the predominant language spoken within the home.

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8 Although these 6 mothers participated in the study (two in the M&M-Only, two in the F2F-Play & Chat, one in the M&M-F2F and one in the Control group) their data were no included for analyses because of the effect post-natal depression can have on mothers’ interaction with their infants (as discussed in section 1.3.2.

9 Two of these infants were in the Control group, one in the F2F-Only group and one in the M&M-Only group.
environments; four of the mothers had English as their second language, their first languages being Mandarin, Spanish, Norwegian and French. While mothers regarded themselves as being healthy, 67% reported that they had experienced problems with breastfeeding, which caused distress during the early weeks of parenting.

5.3.2 Recruitment

This research project was approved by the Human Research Ethics Committee of The University of Western Sydney, and Queensland Health - Royal Children’s Hospital and District Health Service. Participants were recruited from three Maternal and Infant Health clinics of the Queensland Community Health Department. Two clinics serviced families of the Central-Western area of Brisbane, and the remaining clinic was in the Northern area. All were within a seven-kilometre radius of Brisbane’s central business district and generally service middle-class socio-economic families.

5.3.2.1 Clinic Involvement

Brochures, that included the researcher’s telephone number and described the research, were placed on notice boards in the clinics. The researcher also met with groups of mothers who were participating in education classes for first-time parents at the clinics to discuss the research project. Mothers were told the focus of the research was on mother-infant interactions, exploring the types of activities that mothers share with their infants, and given a brochure. The researcher asked interested mothers to telephone and discuss their participation.

5.3.2.2 Participants Contact the Researcher

Once mothers called the researcher, they were asked at which clinic they received the brochure and whether they were participating in the education classes for first-time parents at that clinic. Mothers were randomly assigned to one of the four groups at

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10 The Mandarin speaking mother and the Spanish speaking mother participated in the M&M-F2F group, the Norwegian speaking mother participated in the F2F-Only group and the French speaking mother was a Control group participant
11 Appendix 5 UWS Ethic Approval
12 Appendix 6 Queensland Health Ethics
13 Appendix 7 Clinics and locations
14 Appendix 8 Clinic brochures
the time of calling, using numbers from a random numbers table, so that assignment was without bias.

All prospective participants were informed that the aim of the project was to investigate how first-time mothers use and enjoy activities such as relaxation, using music, games and toys with their infants and social contact with others (family and friends) as part of their relationship with their infant. They were told they would be required to sign a consent form prior to their participation and fill out questionnaires in relation to their role as a mother and the type of activities they shared with their infants. Mothers were also asked if they were planning to be away (e.g. a vacation) during the 5-week participation period. If so, participation in the research project was not appropriate. One participant only who was initially assigned to the Control group did not commence participation because of a planned vacation during the 5-week control period. No mothers dropped out at the conclusion of the researcher’s description of their proposed participation in the study.

Exclusion criteria were established such that the data of mothers who attended less than four of the five face-to-face group sessions (for the M&M-F2F and F2F-Only programs), or could not be contacted for at least four of the five planned telephone discussion sessions during the 5-week period in the M&M-Only group would be excluded. No mothers’ data were rejected from the study due to these criteria (see also section 5.4.1).

5.3.2.3 Participant Information about Involvement in the Research Study

The researcher’s group-specific description to the mothers about their specific involvement during the initial telephone conversation was as follows.

1. *Music & Movement with Face-to-Face contact - M&M-F2F group*

It was explained that the researcher would present a 5-week program of mother-infant activities that involved relaxation, movement, songs, rhymes and games. Mothers and their infants were required to meet weekly at the clinic from which they were recruited, meeting in a group of 8-10 first-time mothers and their infants under the age of 6 months. Mothers were told they would also be given an audiotape of the music, songs and rhymes used during the sessions for their use at home during the 5 weeks. Mothers were informed that the face-to-face sessions with the researcher
would be video-recorded and that all taped material was strictly confidential and for the use in the research project only.

2. *Music & Movement without Face-to-Face contact - M&M-Only group*

It was explained that over a 5 week period, and at their own pace, the mothers would use a self-instruction program of activities with their infants that involved relaxation, movement, the use of songs and rhymes, and games suitable for young infants. The program was in the form of an audiotape and written material that guided the mothers through the activities. Mothers were told that the researcher would telephone them weekly (for approximately 10-15 minutes) to discuss their progress, and if needed, participants could phone the researcher if they had questions that needed to be answered outside of the organised time for phone contact.

3. *No Music & Movement with Face-to-Face contact – F2F-Only group*

It was explained that over a 5-week period, the researcher would facilitate a program that gave mothers the opportunity to meet other first-time mothers and their infants under the age of 6 months in an informal, small group (8-10 mothers and their infants) at the clinic used for recruitment. Discussions about their transition to motherhood, infant development and play ideas were part of the program. The 5 weekly sessions would be video-taped with the material being strictly confidential and used only for the purpose of the research project. At the end of the 5 weeks the mothers would then have the opportunity to use, at their own pace, a self-instruction program consisting of an audio-tape of activities and written material (the M&M-SI program). This was a condition required by the Human Ethics Committee of the University of Western Sydney in order to give all participants the opportunity to participate in the music and movement program. All mothers took up this opportunity (although post-program data were not included as part of the results, see Footnote 14, section 5.3.5).

4. *No Music & Movement and No Contact - Control*

It was explained to the mothers that over a 5-week period the researcher was interested in the types of activities they shared with their infants, and that they would be given questionnaires at the start and end of this period. At the end of the 5 weeks the mothers and infants then had the opportunity to participate in a 5 week program.
of activities with other first-time mothers and their infants that involved relaxation, movement, the use of songs and rhymes, and games that can be played with young infants (the M&M-F2F program). As for the F2F-Only group, this opportunity was a condition required by the Human Ethics Committee of The University of Western Sydney. All mothers then took part in the M&M-F2F program (although post-program participation data were not included as part of the results, see Footnote 14, section 5.3.5).

If mothers were still interested after the details of their involvement were explained, an initial appointment of about one hour (either in their home or at the Maternal and Infant Health clinic, at the mother’s choice) was arranged for signing the participant consent form, and completion of the pre-test questionnaires. This formed the pre-test part of the experiment.

5.3.3 Group procedures
The time period for completing the implementation of programs for this study was thirteen months. Each of the three clinics used for recruitment provided a room with adequate space (approximately 6 metres x 4 metres) to conduct the Music and Movement Face-to-Face (M&M-F2F) program group sessions and the Play & Chat Face-to-Face (F2F-Only) program group sessions. All M&M-F2F and F2F-Only sessions were videotaped with the consent of the participants using a JVC Compact VHS recorder positioned on a tripod.

5.3.3.1 The Music & Movement Face-to-Face (M&M-F2F) group
Three M&M-F2F program groups of 8-10 mother-infant pairs were formed. Mothers and infants attended weekly music and movement sessions over a 5-week period facilitated by the researcher. The contact time the mothers and their infants had together with the researcher was one and a half hours each week – one hour for M&M instruction and half an hour for morning tea at the end of each session which gave the mothers and their infants time to socialise.

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15 See Appendix 2 for the M&M-F2F program format
In addition to the instruction for this group through the modelling of techniques presented by the researcher, an audiotape of the program’s music and a written guide to the content of the tape were given to the mothers at the first session to use within the home environment between sessions. It was emphasised to the mothers that the practice of the activities with their infants should be adapted to their daily routines and to make time each day for having fun using the activities. Mothers were provided with a copy of song lyrics and rhymes relevant for each session.

The presentation of the five topics was sequential, beginning with Topic 1 which required a passive level of participation, allowing mothers to build on their communicative skills and confidence in using music and movement with their infants in a peer group setting. During the weekly sessions, mothers were encouraged to discuss their progress and how they used the activities at home.

5.3.3.2 The Music & Movement Self-Instruction (M&M-Only) group

The M&M-Only group used the program of written instructions and an audio tape at home for 5 weeks. The audiotape of the program’s musical content was the same as those for the M&M-F2F group except recorded vocal instructions by the researcher were included to encourage mothers’ use of the activities. The written instructions provided background information about each of the five topics of the program together with the words of the songs and rhymes.

At the time of pre-test and on completion of the questionnaires, the researcher introduced the program to the mothers. Voice, touch and movement techniques were demonstrated to mothers. The researcher suggested that mothers listen to the complete audiotape as an introduction to the program so that they would become familiar with the program content and to then proceed with the activities at their own pace. It was emphasised to these mothers, as it was for the M&M-F2F group, that the music activities should be integrated into their daily routines and to make time each day for having fun using the activities. Improvisation and adapting the songs to suit the situation were also encouraged.

16 See Appendix 3 for the M&M-SI (Self-Instruction) program format
Each week the researcher telephoned the participants for approximately 10 minutes to discuss and encourage progress. Mothers spoke of engaging with their infants using the activities and their infants’ reactions, preferences for particular program content, and the frequency of practicing the activities, and also asked questions regarding their infant’s development. Mothers were assured that if they had questions regarding their participation and required information outside of the organised phone contact time, they could phone the researcher. No mothers required additional information.

5.3.3.3 The Play and Chat (F2F-Only) group\(^{17}\)

The F2F-Only mother-infant pairs formed three groups of 8-10 dyads each. Over a 5-week period mothers and their infants met weekly with the researcher for one and a half hours at the same three clinics used for the M&M-F2F groups. The time allocated for each F2F session matched that of the M&M-F2F program in order to provide equivalent social contact time with the researcher and other mothers and infants. In the F2F-Only sessions an informal group environment was created so that mothers could discuss parenting issues and learn about interacting with their infants through play.

Each week the room was set up with chairs in a large circle but mothers were encouraged to sit on the floor with the researcher and place their infants on the comfortable floor matting in the centre of the circle. This gave mothers the opportunity to practise the play techniques that were being modelled/demonstrated by the researcher and to interact with the other babies and mothers. Tea and coffee were provided throughout the sessions.

5.3.3.4 The No Treatment (Control) group

During the 5-week control period (after pretest and before post-test data collection), the Control mother-infant pairs did not take part in any program associated with the research and had no contact with the researcher.

\(^{17}\) See Appendix 4 for the Play and Chat program
5.3.4 Data Collection Procedure
Self-report questionnaires were administered by the researcher pre- and post participation in the study\(^\text{18}\) in the homes of the participant (although participants were given a choice of either meeting with the researcher at their clinic or in their own home). To put the mothers at ease, the researcher at first initiated a general conversation usually focusing on the baby. Using Infant-Directed Speech and gestures the researcher talked to the baby, which led the mother into conversation. While answering the questionnaires, the researcher offered to hold the baby. If mothers were unsure about any of the questions being asked in the questionnaires, the researcher clarified the questions and encouraged mothers to answer according to the question’s content. The researcher was at all times careful not to guide the mother towards any particular answer.

5.3.5 Questionnaires
Both validated and non-validated questionnaires were used. Four questionnaires were designed by the researcher to obtain general information from the participants, to identify activities they shared with their infants, ascertain the degree of their existing involvement in music and movement activities, and to evaluate the M&M program. These questionnaires consisted of both Likert-type scales and open-ended response formats. Likert-type scales used for measuring psychological constructs such as feelings, perceptions, sensations, emotions and opinions have been criticised for producing bias associated with participant acquiescence to positively worded items (Friborg, Martinussen & Rosenvinge, 2006). One method of overcoming this problem is to design Likert-type questionnaires to contain an even distribution of both positively and negatively worded items (Tastle & Wierman, 2006). However, the inclusion of negatively worded items can be error-laden due to the task being cognitively burdensome for participants and can affect their motivation to respond appropriately (Visser, Krosnick & Lavrakas, 2000). Considering this latter point in devising the three Likert scale questionnaires for this study it was decided to only include positively worded items. To increase validity and reliability, a 7-point scale

\(^\text{18}\) After post-test data collection, the F2F-Only and the Control group mothers and infants participated in the M&M program (as noted previously in section 5.3.2.3). Further data were collected post-program which included the M&M Program Evaluation. However, as this program was specifically devised for infants under the age of 6 months, and as some of the F2F-Only and the Control group infants were over the age of 6 months by this stage, some activities were modified to suit infants’ age variation. Because of this inconsistency that occurred in the content of the M&M program, resultant data were not included as part of the study.
was devised for two questionnaires and a 5-point scale with open-ended questions to qualify the responses was devised for one questionnaire.

The face validity of these researcher designed questionnaires could also be a source of criticism. As *face validity* is concerned with how a measure appears (i.e. if it ‘looks like’ it is going to measure what it is supposed to measure) subjectiveness within the content could present as a weakness of the design (Fink, 1995). However, if survey information is required as part of a research investigation and validated questionnaires are not appropriate simply because they are not designed to measure the required information, specific questionnaires need to be devised. Fink (1995) suggests that such questionnaires must be pilot tested to help produce a survey that is usable and will provide the information required. The study by Vlismas and Bowes (1999) piloted the four researcher designed questionnaires. Although not all collected data from these questionnaires for this project were reported, the questionnaires were found to consistently measure mother-infant interactions and mothers’ evaluations of the music and movement program.

The researcher designed questionnaires were as follows:

1. General Information Questionnaire
2. Mother-Infant Activities Questionnaire (The MIA)
3. Mother-Infant Music Interest Questionnaire (The MIMI)

The *General Information questionnaire* consisted of 16 items including mothers’ demographics details, information regarding the pregnancy, social support, their health since the birth and difficulties they may have experienced in their mothering role, and their infant’s health and behaviour.

The *Mother-Infant Activities Questionnaire (MIA)* was a 7-point Likert-type scale questionnaire consisting of 10 items concerning mothers’ social and behavioural interactions with their infants. The scale’s internal consistency and reliability was
calculated using Cronbach’s alpha coefficient on pre- and post-test data with the results of .72 and .76 respectively, indicating acceptable internal consistency (George & Mallery, 2003). Statistical details are shown in Appendix 10.

The *Mother-Infant Music Interest Questionnaire (MIMI)* questionnaire concerned mothers’ enjoyment and use of music, movement and touch interactions with their infants. It included 8 questions to be answered using a 7-point Likert-type scale and nine open-ended questions to qualify the responses given on the Likert-type scale23. Responses to the open-ended questions were coded manually by the researcher according to their commonality and frequencies. Cronbach’s alpha coefficient for internal consistency and reliability of the eight likert scale items was calculated at .75 (pretest) and .80 (posttest). Statistical details are shown in Appendix 11.

The *M&M Program Evaluation questionnaire* consisted of 20 items concerned with mothers’ assessment of the program. Ten questions involved a 5-point Likert-type scale, and there were 10 further open-ended questions asking for details concerning the program content and mothers’ perceptions of the program benefits. The same procedure as in coding the MIMI open-ended questions was applied. Cronbach’s alpha coefficient was calculated at .652 indicating the internal consistency and reliability of the scale to be questionable (George & Mallery, 2003). Question 11, “I would continue to use only some sections of the tape” showed a low item-total correlation. If deleted from the scale, Cronbach’s alpha coefficient would have been .795. Nevertheless, the item was retained in the scale for factor analysis relating to the program evaluation results. Statistical details are shown in Appendix 12. Question 14, which asked about mothers’ preference for the method of M&M instruction, differed according to the M&M group the mothers participated in. The M&M-F2F group was asked if participation in a face-to-face group situation was preferred over a self-instruction method, and the M&M-Only group was asked if their self-instruction method was preferred over a face-to-face group instruction method.

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23 Two items – *I sing songs to my baby* and *I rock my baby* appeared in both the MIA and the MIMI questionnaires. These items were repeated in the MIMI only for obtaining the mothers’ qualitative data that described their interactions using songs and the rocking of their infants.
In addition to researcher designed questionnaires, four validated questionnaires with Likert-type scale formats were used to investigate maternal well-being and to assess if the factors of M&M and F2F contact impacted on mothers’ perception of their well-being. These questionnaires were used to screen mothers for post-natal depression, to assess maternal attitudes to parenting, parental stress and post-natal maternal attachment. These questionnaires were:

1. Edinburgh Post-Natal Depression Scale (EPDS)
2. Maternal Attitudes Questionnaire (MAQ)
3. Parenting Stress Index/Short Form (PSI/SF)
4. Maternal Postnatal Attachment Scale (MPNAS)

The Edinburgh Post-natal Depression Scale (EPDS) was used to screen mothers for postnatal depression. It is a 10-item self-report questionnaire developed by Cox, Holden and Sagovsky (1987) and has been validated (Boyce, Stubbs & Todd, 1993; Cox et al., 1987; Harris, Huckle, Thomas, Johns & Fung, 1989; Murray & Carothers, 1990) as an international screening measure for post-natal depression to be used ante-natally and up to 18 months post-natally (Barnett & Fowler, 1995). The scale can also be used to monitor progress for women being treated for post-natal depression. For assessment, mothers select one of four responses to ten statements, which indicate their mood during the previous week. Scores can range from 0 – 30 and give indications of three diagnostic categories:

- 9 or below - probably not depressed
- 10 – 12 - possibility of depression
- 13 and above - significant depression is likely

The Maternal Attitudes Questionnaire (MAQ) (Warner, Appleby, Whitton & Faragher, 1997) was employed to measure mothers’ cognitions relating to self-image and maternal role definition, expectations of motherhood and expectations of the self as a mother. As discussed previously (see section 1.2), first-time mothers can have unrealistic expectations of motherhood which impinge on their parenting ability and can cause anxiety. This scale consisted of 14 Likert-type scale items, with a total

24 Appendix 13 The Edinburgh Postnatal Depression Scale
25 Appendix 14 Maternal Attitudes Questionnaire
26 Appendix 15 Parenting Stress Index/Short Form
27 Appendix 16 Maternal Postnatal Attachment Scale
possible score ranging from 0 (positive cognition) to 28 (negative cognition). Warner and colleagues (1997) tested the validity of the scale on 483 women and claim the test-retest and internal reliability to be high. This scale has been shown to be highly correlated with the EPDS and it is reported that the results show a strong association between postnatal depression and negative cognitions (Warner et al., 1997). From the validation of this instrument, Warner et al. (1997) noted that the mean score on the MAQ in women scoring <10 on the EPDS to be 2.4 and for women scoring ≥ 10 on the EPDS to be 6.3.

The Parenting Stress Index/Short Form (PSI/SF) is an adapted version of The Parenting Stress Index by Abidin (1995). It consists of 36 items and examines the parent-child system by focusing on the parent, the parent’s perception of the child (ranging from 1 month to 12 years of age) and the interactions of the dyad. In particular, this scale was used to assess if the sample of first-time mothers were experiencing stress associated with the developing relationship with their infant as it was discussed in section 1.3.2.1 and 2.2.3 that such stress can affect mothers’ caregiving ability and interaction with their infants. A Likert scale of 1-5 is used for scoring the items. Three subscales are derived from these items: Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child. A Total Stress score is obtained by adding scores of the three subscales. Scores can range from 36 to 180 and indicate the degree of stress being experienced in the areas of personal parental distress, stress derived from the parent’s interactions with the child, and stress that results from the child’s behaviour (Abidin, 1995). Parents who obtain a Total Stress score of 90 or higher are experiencing clinically significant levels of stress.

To assess the mothers’ sensitivity towards, and degree of attachment to, their infants, the Maternal Post-Natal Attachment Scale (MSNAS) of 19 items was employed. It was developed by Condon and Corkindale (1998) as an alternative to behavioural observation of mother-to-infant attachment and maternal emotions and cognitions relating to attachment during the first post-natal year. They argued that assessment of attachment by behavioural observations excludes parents’ subjective experiences of their infants which can be expressed through a questionnaire. The domains of behaviour assessed are ‘Quality of attachment’ (measuring mothers’ emotions for their infant and competence in the role as mother), ‘Absence of hostility’ (measuring
mothers’ tolerance of their infant and responsibilities of infant care), and ‘Pleasure of interaction’ (measuring mothers’ desire for interaction and pleasure of proximity to their infants)\(^{28}\). The Total Attachment score for a participant can range from 19 (lowest attachment score) to 95 (highest attachment score). In their research to validate this scale, Condon and Corkindale (1998) reported that at the infant age of 4 months, the normal score distribution for post-natal mothers has a mean of 84.1 (SD = 7.0, Range = 59-95). For the purpose of this research project the questionnaire\(^{29}\) was modified by the researcher to include a 5-point Likert-type scale for each question to ensure consistency in the scoring of each item, which ranged from Very Low Attachment to Very High Attachment. Altering the scale did not affect its internal consistency and reliability (see Appendix 16).

Considering the types of information that were required from the mothers, a structured order for administering the questionnaires was employed. The order was graded from requesting general information details to the mothers being questioned about their feelings regarding their maternal role and about their infant.

The presentation order of the questionnaires in the pretest was:
1. General Information
2. Mother-Infant Activities (MIA)
3. Mother-Infant Music Interest (MIMI)
5. Maternal Attitudes (MAQ)
6. Maternal Postnatal Attachment (MPNAS)
7. Parenting Stress Index Short Form (PSI/SF)
8. Edinburgh Postnatal Depression Scale (EPDS)

This order remained unchanged for the post-test with the exception that the General Information questionnaire was omitted and the two M&M groups were required to answer the M&M Program Evaluation questionnaire after the EPDS questionnaire.

\(^{28}\) The questionnaire was obtained from Professor John Condon and Carolyn Corkindale, Department of Psychiatry, Flinders Medical Centre, Bedford Park, South Australia. Since the publication of the article reviewing the scale the authors revised the names of domains. On the authors’ advice, the domains were renamed as ‘Quality of attachment’, ‘Absence of hostility’, and ‘Pleasure of interaction’. It was also suggested the rating options of the items be recoded to represent a 5-point Likert-type scale as adopted here.

\(^{29}\) Appendix 17 The original version of the MPNAS scale
5.4 RESULTS

5.4.1 Introduction
Results of the sample of 96 first-time mothers\(^{30}\) will be presented in sections 5.4.2, 5.4.3, and 5.4.4, according to the three research aims:

1. The effects of music and movement (M&M) and face-to-face (F2F) contact on the frequency of mothers’ interactions with their infants
2. The effects of music and movement (M&M) and face-to-face (F2F) contact on maternal well-being
3. Mothers’ evaluation of the M&M program.

SPSS Version 12 was used for statistical analyses. Detailed output of the statistical results are presented as appendices in the CD labelled \textit{CD Results}. Qualitative results of the open-ended questions from the MIMA questionnaire regarding mothers’ use of music and movement and their interactions with their infants are presented as supplementary data\(^{31}\).

5.4.2 The effects of M&M and F2F contact on mothers’ interactions with their infants
In order to investigate the effects of M&M and F2F contact on mothers’ interactions with their infants, split-plot analyses of variance (ANOVAs) with a 2 x 2 x (2) design were conducted. The two between-subjects factors were M&M (present or absent) and F2F (present or absent), and the within-subjects factor was time (pre-and post-test ratings). The dependent variables were factor scores extracted from mothers’ ratings from the two researcher designed questionnaires; the Mother-Infant Activities questionnaire (MIA, 10 items) and the Mother-Infant Music Interest questionnaire (MIMI, 6 items).

Outliers were present in four of the 16 questionnaire items however there were no particular participants whose scores consistently identified them as outliers, nor were outliers restricted to or concentrated in any particular group, so all results were

\(^{30}\) Group attendances during the 5 weeks were: 21 M&M-F2F mother-infant pairs attended five sessions and three were absent for one session; All 24 M&M-Only mothers had five weekly phone discussions with the researcher; 19 F2F-Only mother-infant pairs attended 5 sessions with five being absent for one session.

\(^{31}\) CD Results Appendix 1 – Qualitative results of the MIMA questionnaire
retained for factor analysis. The Principal Component Analysis (PCA)\textsuperscript{32} technique was applied to determine the dimensionality of the data, and revealed five components with initial eigenvalues exceeding unity. The Kaiser-Meyer-Olkin Sampling Adequacy (KMO) value was .820 which exceeded the recommended value of .6 (Kaiser, 1970, 1974) and the Barlett’s Test of Sphericity reached statistical significance of p<.001, which supported the factorability of the correlation matrix.

Similarly, the Principal Axis Factoring (PAF)\textsuperscript{33} technique extracted five factors with initial eigenvalues exceeding unity, and explaining 61.6% of the variance. The Kaiser-Meyer-Olkin Sampling Adequacy (KMO) value was .817. With further exploration using both Varimax and Direct Oblimin rotation on PCA and PAF results, the final analysis was conducted using PAF and Direct Oblimin rotation which increased interpretability of the factors by presenting less error variability. As suggested by Coakes and Steed (1999) the oblique rotation (Direct Oblimin) is a more appropriate choice than the orthogonal rotation when items are designed to measure related constructs, as was the case of mothers’ interactive behaviours with their infants.

Table 5.2 illustrates the loadings in the pattern matrix representing the relationship between the factors and the variables. The table shows that two of the variables did not load, as absolute values less than .3 were suppressed, eliminating ‘rocking the baby’ and ‘take baby to clinic’ (from the MIA questionnaire). These variables were re-worded for analyses but regardless of the change to the wording the variables failed to load. A likely explanation as to why ‘take the baby to clinic’ did not load is because of its lack of communality to the clustering of the items that formed the 5 factors. The fact that ‘rocking the baby’ did not load was surprising as it was assumed to be a relevant item relating to mothers’ use of movement with their infants. Coakes and Steed (1999) and Pallant (2001) recognise that factor analysis is sensitive to outliers within the items. However, there were no outliers in the pre- and post-test data of this item. Despite efforts of rewording the item for re-analysis, as it has been also recognised that factor analysis can be sensitive to the wording of items

\textsuperscript{32} CD Results Appendix 2 – Statistical output of Principal Component Analysis results
\textsuperscript{33} CD Results Appendix 3 - Statistical output of Principal Axis Factoring Analysis and Direct Oblimin results
(Dwyer, 1998), no reason could be found as to why ‘rocking the baby’ did not load. If the reader wishes to examine the qualitative data regarding the frequency of ‘For what purpose do you rock your baby’ they are presented in the CD, Appendix 1, Table 6).

Table 5.2

*Factor analysis pattern matrix and titles of the factors.*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Music &amp; Enjoyment of Interactions</th>
<th>Play Interactions</th>
<th>Social Interactions</th>
<th>Movement Interactions</th>
<th>Touch Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>mothers enjoy music</td>
<td>.820</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mothers enjoy music with baby</td>
<td>.717</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mothers relax to music with baby</td>
<td>.634</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sing to baby</td>
<td>.348</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rocking the baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>play with baby</td>
<td>.842</td>
<td>.554</td>
<td>.644</td>
<td>.636</td>
<td></td>
</tr>
<tr>
<td>talk with baby</td>
<td>.745</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>relax with baby</td>
<td>.324</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>take baby out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.785</td>
</tr>
<tr>
<td>take baby to shops</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.352</td>
</tr>
<tr>
<td>take baby for walk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mothers enjoy dance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.543</td>
</tr>
<tr>
<td>dance with baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.364</td>
</tr>
<tr>
<td>massage baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.644</td>
</tr>
<tr>
<td>touch baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.636</td>
</tr>
<tr>
<td>take baby to clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


As shown in Table 5.2 loadings for the four variables ‘sing to baby’, ‘relax with baby’, ‘take baby to shops’ and ‘dance with baby’ were relatively low, but it was considered preferable to retain them as they were meaningful to the interpretation of the factors. In this regard Tabachnick and Fidell (1996) suggest only variables with

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34 The fact that this variable did not load eliminates it from factor analysis and to present the pre- and post-test mean score results of the frequency that mothers rocked their babies as a single item is considered unimportant in comparison to the significant results of Study 1.
loadings of .32 and above should be interpreted, and these variables loaded above this limit.

As factor analysis is a (computer generated) technique used to cluster variables according to communality i.e. the inter-correlations of a set of variables, Pett, Lackey and Sullivan (2003) and Dwyer (1998) suggest that the naming of factors should be based on the theme or the common element that is associated with the loaded variables. Hence, the 5 factors were labelled according to the communality of the variables. Also taken into account with the naming of the variables was the linking of the relevant literature reviewed in chapters 1 to 4.

The factor *Music and Enjoyment of Interactions* shows communality with mothers’ enjoyment of music as part of their daily practice and enjoyment of interacting with their infants using music, as described by the wording of the four variables – *mothers enjoy music, mothers enjoy music with baby, mothers relax to music with baby* and *sing to baby*. The discussion of section 4.4 proposed that mothers’ use of music for their own pleasure and relaxation may benefit their wellbeing, and that enjoyment of musical activities with their infants may enhance the communicative interactions with their infants.

The factor *Play Interactions* was named according to the three variables associated with the mothers relaxing and talking with their infants during playful interactions. The naming of this factor was also associated with the discussion of the developing mother-infant relationship presented in section 2.1.2. It addressed the important role of the sensitive mother’s use of dialogue during play interactions and how a tension free environment created by the mother during such interactions stimulated the infant’s desire to partner the mother.

The two variables of *Social Interactions* – ‘take baby out’ and ‘take baby to the shops’ – were not reflective of the mothers’ one-on-one interactions with their infants but rather their social activities with their infants outside of the home. The importance of mothers’ access to a social network in the early months of parenting were discussed in section 1.3.2.1 indicating that mothers’ social support networks buffer the effects of stress during the early postpartum months, which positively affects the mother’s ability to provide a sensitive caregiving environment for her
infant. While it could not be assumed that the mothers took their infants on outings and shopping for the purpose of socialising with others, it was evident from discussions the researcher had with the mothers at the time of pre- and post-test that many had formed networks with other mothers they had met through the clinics from which they were recruited. Such outings included meeting for coffee at shopping centres and going to the movies with their infants.

The *Movement Interactions* factor included mothers’ own enjoyment of dance, dancing with their infants and taking their babies walking, e.g., in a pram. It was considered inappropriate to include the word *Rhythmical* in the labelling of Movement Interactions because of the inclusion of the variable ‘taking the baby for a walk’. Rhythmical types of movement interactions were discussed in section 3.4 as consisting of mothers’ rhythmical use of dancing with and swaying/rocking their babies that aroused pleasure and enhanced dyadic wellbeing. As discussed previously it was unexpected that the variable ‘rocking the baby’ did not cluster to this factor, as it was considered a rhythmical type of activity that mothers practice with their infants. The variable ‘taking the baby for a walk’ was included in the 16 items for factor analysis as part of investigating mothers activities with their infants.

The *Touch Interactions* label was applied because both variables ‘touch baby’ and ‘massage baby’ were associated with the types of touch that mothers use when interacting with their infants. Mothers’ use of sensitive touch such as stroking and massaging their infants was discussed in section 3.3.1 as being an important part of the communicative interactions that assist with the soothing of the infant and self-regulation. Touch interactions also extend to mothers’ use of playful touch such as tickly games. As discussed in section 4.6.1 mothers’ use of playfulness through tickly games can stimulate infants’ positive mood states. Mothers’ use of both sensitive and playful touch is thought to produce a sense of wellbeing with their infants and positively affect the mutuality of the dyadic relationship.

Factor scores were obtained from the set of five factors for pre-and post-test analyses using the regression approach. This approach results in the highest correlations between factors and factor scores and is suggested by Tabachnick and Fidell (1996) as the preferred method simply because it is the best understood and most widely
used. Five 2 x 2 x (2) ANOVAs were conducted, one on each of the five factors – Music and Enjoyment of Interactions, Play Interactions, Social Interactions, Movement Interactions, and Touch Interactions. Unless stated otherwise, alpha was set at .05 for all analyses and results for Levene’s Test of Equality of Error Variances for all calculations were not significant indicating that the assumption of homogeneity of variance was met for the dependent variables.

5.4.2.1 Music and Enjoyment of Interactions

Results of the Music and Enjoyment of Interactions factor for the four groups are graphically shown in Figure 5. Although the four groups were equivalently representative of healthy first-time mothers and infants, variability within the groups’ pre-test mean factor scores occurred. The greatest variability occurred between the M&M-Only group (lowest mean factor score) and the F2F-Only group (highest mean factor score). As shown by the post-test results, over the 5-week period there was an increase for both the M&M groups and a decrease for the No M&M groups. Graphs of the pre- and post-test mean scores of the four variables that represent this factor - mothers’ enjoyment of music, enjoyment of music with their infants, singing to their infants and relaxing to music with their infants - show the two M&M groups increased in these four variables, while the F2F-Only group showed greater decreases in all these variables compared to the Control group.

Figure 5.1 Music & Enjoyment of Interaction pre- and post-test mean factor scores for individual groups. Error bars represent standard error of the mean.

35 CD Results Appendix 4- Statistical output of Enjoyment of Music Interactions results
The Split-Plot ANOVA results show that there was a significant main effect of Time \[ F (1, 92) = 11.63, p = .001 \] and a significant Time x M&M interaction \[ F (1, 92) = 31.154, p < .001 \] indicating that the combined factor scores of the two M&M groups increase more over the 5-week period than the two No M&M groups. The Partial Eta Squared \( \eta^2 \) results which report the effect size in terms of the proportion of variance of the dependent variable explained by the independent variable indicate that 11\% \( (\text{Partial } \eta^2 = .11) \) of variance of the dependent variable (Music and Enjoyment of Interactions) is explained by the Independent Variable of Time, and 25\% by the interaction of Time x M&M. Cohen (1988) suggests that partial eta squared values between .01 and .05 are a small effect, .06 to .13 are a moderate effect and .14 and beyond are a large effect. Thus, here Time has a moderate effect size and the interaction of Time x M&M has a large effect size.

Results of the effect of F2F contact showed there was a significant between-subjects effect of F2F contact \[ F(1,92) = 4.671, p = .033, \text{ partial } \eta^2 = .048 \]. As can be seen in Figure 5.1 this indicates that, collapsed over time, groups with F2F contact had higher scores overall than those without F2F contact. However, as there were no significant interaction of Time x F2F contact \[ F (1, 92) = 1.236, p = .269 \] or of Time x F2F contact x M&M, this F2F contact effect shows no differential change over time as a function of presence or absence of F2F contact.

In summary, the M&M factor significantly increased mothers’ Music and Enjoyment of Interactions over the 5-week period, the F2F contact factor had no effect on mothers’ Music and Enjoyment of Interactions over time, and there were no other main effects or interactions. Regarding the M&M-Only pre-test score being the lowest of the four groups, post-test results showed this group’s Music and Enjoyment of Interactions, as well as that of the M&M-F2F group, exceeded the No-M&M groups’ post-test mean scores. These results show that intervention using the M&M instruction improved Music and Enjoyment of Interactions over time irrespective of whether M&M was presented face-to-face or self-instructed.

5.4.2.2 Play Interactions
Results of the Play Interactions factor for the four groups are graphically represented in Figure 5.2. Similar to the Music and Enjoyment of Interactions factor, group variability was evident at the time of pre-test with the M&M-Only group pre-test results being considerably lower compared to the other three groups’ results. Most variability occurred between the M&M-F2F group and the M&M-Only group. The post-test results of the M&M-Only group showed an increase over the 5 weeks, with the other three groups decreasing in their play interactions.

![Play Interactions](image)

**Figure 5.2** Play Interactions Interaction pre- and post-test mean factor scores for individual groups. Error bars represent standard error of the mean.

There was no significant main effect of Time or interaction of Time x M&M.\(^{36}\) However, there was a significant interaction of Time x F2F contact \([F(1,92) = 4.053, p = .047, \text{ partial } \eta^2 = .042]\), but no significant interactions of Time x F2F contact x M&M or of M&M x F2F contact. This Time x F2F effect indicates that F2F contact led to greater decreases in Play Interactions over time than no F2F contact, and especially the M&M-Only group showed an increase in Play Interactions over time. Graphs illustrating the results of the three variables of this factor (see Appendix 5), showed that it was an increase in *Mothers play with infants* and *Mothers talk with infants* that attributed to this increase in the M&M-Only group.

In summary, the M&M factor had no significant effect on mothers’ Play Interactions over the 5-week period. However, lack of F2F contact did have a significant effect

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\(^{36}\) CD Results Appendix 5 Statistical output of Play Interactions results
over time. Specifically, M&M-Only group mothers significantly increased their play interactions with their infants, while in the other three groups decreased over time. Despite the M&M-Only group’s increase exceeding the post-test mean scores of the No-M&M groups, it was equivalent to that of the M&M-F2F group’s post-test results. So both M&M groups’ post-test results were similar.

5.4.2.3 Social Interactions

The pre- and post-test results for mothers’ social activities with their infants in the four groups are graphically represented in Figure 5.3. As can be seen, there was an increase for all groups over the 5 week period.

![Figure 5.3 Social Interactions pre- and post-test mean factor scores for individual groups. Error bars represent standard error of the mean.](image)

Results\(^{37}\) showed there was a significant main effect of Time \([F(1, 92) = 24.876, p < .001, \text{ partial } \eta^2 = .213]\) but no significant interactions of Time x M&M, Time x F2F contact or Time x F2F contact x M&M, or of the two between-subjects factors, F2F contact x M&M. Graphs (see Appendix 6) for the pre-and post-test of the mean scores of the two variables that represent this factor—mothers take their infants on outings to socialise with others and mothers take the infants shopping—show all groups increased their social activities for both variables, with the exception of the Control group which remained unchanged with taking their infants shopping.

\(^{37}\) CD Appendix 6 Statistical output of Social Interactions results
In summary, the M&M and F2F contact factors had no effect on mothers’ social interactions over time. Mothers’ social interactions increased as an effect of time only over the 5-week period.

### 5.4.2.4 Movement Interactions

The pre- and post-test results of the Movement Interactions factor for the four groups are graphically represented in Figure 5.4. Again, the results show variability within the four groups at pre-test and similar to those of Music and Enjoyment of Interactions factor results, the greatest variability occurred between the M&M-Only group (lowest mean factor score) and the F2F-Only group (highest mean factor score). Post-test results show there was an increase for all groups over the 5 week period.

![Figure 5.4 Movement Interactions pre- and post-test mean factor scores for individual groups. Error bars represent standard error of the mean.](image-url)

Results showed a significant main effect of Time \( [F(1, 92) = 21.281, p < .001, \text{partial } \eta^2 = .188] \), and a significant interaction of Time x M&M \( [F(1, 92) = 4.29, p = .041, \text{partial } \eta^2 = .045] \). Results also showed a significant between-subjects effect of M&M \( [F(1, 92) = 4.007, p = .048, \text{partial } \eta^2 = .042] \), but no significant Time x F2F contact or Time x F2F contact x M&M effects. Pre-and post-test graphs of the mean scores of the three variables that represent the Movement Interaction factor – *mothers’ enjoyment of dance, mother and infant dance, and mother takes infant for a walk* (see Appendix 7) – illustrate the M&M groups increased their use and

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38 CD Appendix 7 Statistical output of Movement Interaction results
enjoyment of dance interactions with their infants while the No M&M groups showing an increase in their outdoor walking exercise with their infants.

In summary, F2F contact had no effect on mothers’ Movement Interactions over time however M&M did. Although all groups increased their Movement Interactions over time, the increases were significantly greater when M&M was present – in the M&M-F2F and the M&M-Only groups. Despite all groups’ increases over the 5 weeks both the M&M groups post-test scores did not exceed those of the No-M&M groups indicating that the No-M&M groups’ frequency of Movement Interactions with their infants were more so than those of the M&M groups.

5.4.2.5 Touch Interactions
The pre- and post-test results of the Touch Interactions factor for the four groups are graphically represented in Figure 5.5. Consistent with the pre-test results of the other interaction factors (with the exception of Social Interactions) that indicate group variability, the M&M-Only group’s pre-test mean factor results were again lower than those of the other groups. Similar to those of the Play Interactions pre-test results, the greatest variability occurred between the M&M-Only group and the M&M-F2F group. Although all groups showed some increase over the 5-week period, it was the M&M-Only group which showed the greatest increase, exceeding the post-test mean factor scores of the No-M&M groups. While this result showed the M&M-Only group considerably increased their frequency of Touch Interactions with their infants, it was the M&M-F2F group post-test results that showed a greater frequency of these interactions.
Figure 5.5 Touch Interactions pre- and post-test mean factor scores for individual groups. Error bars represent standard error of the factor score mean.

For statistical analysis, a more stringent criterion for $\alpha (.01)$ was applied for the Touch results as Levene’s test showed there was a violation of the homogeneity of variance for post-test results. Results\(^{39}\) showed a significant main effect of Time [F(1, 92) = 8.103, $p = .005$ partial $\eta^2 = .081$], and a significant interaction of Time x F2F contact [F(1, 92) = 4.350, $p = .040$] but no significant interactions of Time x M&M, Time x F2F contact x M&M, or between-subject effects of F2F contact x M&M. The graphs illustrating the pre-and post-test mean score results of the two factor variables (see Appendix 8) show the M&M-Only group increased the use of both touch and massage with their infants.

In summary, all groups showed some increase over the 5 week period; M&M per se had no effect on mothers’ Touch Interactions; and the lack of F2F contact had significant effects on Touch Interactions. Specifically, the No F2F contact groups (M&M-Only and Control) showed a greater increase than those who had F2F contact (M&M-F2F and F2F-Only).

5.4.2.6 Summary - Frequency of mothers’ interactions with their infants
Results have shown that at the time of pre-test group variability was evident with the frequency of mothers’ interactions with their infants according to the five factors.

\(^{39}\) CD Results Appendix 8 Statistical output of Touch Interaction results
With the exception of the Social Interaction results, the M&M-Only group showed the lowest mean factor scores. The fact that all groups of first-time mothers were representative of a healthy middle class population and were randomly assigned to the group conditions, there is no clear indicator as to why these results occurred.

Considering the changes that occurred in the four groups’ results over the 5 weeks, Table 5.3 presents a summary of the ANOVA results in sections 5.4.2.1 to 5.4.2.5 with respect to the effects of Time, M&M and F2F contact across the various factors which gauge the frequency of the mothers’ interaction with their infants. As can be seen M&M had a significant effect over time for both the Music and Enjoyment and the Movement factor scores, while F2F had significant effects on Play and Touch, although in the former case the effect was a decrease rather than an increase over time.

Table 5.3

The effects of Time, M&M and F2F contact on the frequency of mothers’ interactions with their infants

<table>
<thead>
<tr>
<th>TYPE OF INTERACTION</th>
<th>TIME</th>
<th>TIME x M&amp;M</th>
<th>TIME x F2F Contact</th>
<th>M&amp;M x F2F Contact</th>
<th>TIME x F2F Contact x M&amp;M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music &amp; Enjoyment</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Play</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Social</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Movement</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Touch</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

✓ Indicates significant result  
× Indicates no significant result

Based on the fact that the M&M program was devised to enhance mothers’ music and movement interactions with their infants, as expected the results show M&M affected just those dependent variables – Music and Movement, while F2F interaction affected dependent variables that would be expected to be affected by social interaction, Play and Touch. The only inconsistency in this explanation is that the effect of F2F contact for Play was one of attenuation, and the Social dependent variable was neutral with respect to the interactional influences of the F2F factor. Nevertheless it can be seen that the factors in the program, M&M, and F2F are in fact independent in their effects on the
mothers’ behaviour and, moreover, that these separable effects are on specific behaviours (dependent variables).

To investigate these effects further, post-hoc t-tests were conducted on pre- vs post-test scores for each group on each of the dependent variables. As there were multiple t-tests, one set for each dependent variable, the alpha rate (0.05) was adjusted by dividing by the number of dependent variables (5), giving an alpha rate of 0.01. (Note no adjustment for the groups’ factor is required as groups was a between-subjects factor, and so different samples were involved). The results of these tests are shown in Table 5.4.

Table 5.4

*Individual groups’ results according to increase/decrease of the frequency of mothers’ interactions with their infants over the 5-week period as calculated by Paired Samples t-tests*

<table>
<thead>
<tr>
<th>Mothers’ Interactions</th>
<th>GROUPS</th>
<th>M&amp;M-F2F</th>
<th>M&amp;M-Only</th>
<th>F2F-Only</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music &amp; Enjoyment</td>
<td>↑ *</td>
<td>↑ *</td>
<td>↓ *</td>
<td>↓</td>
<td></td>
</tr>
<tr>
<td>Play</td>
<td>↓</td>
<td>↑ *</td>
<td>↓</td>
<td>↓</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>↑</td>
<td>↑ *</td>
<td>↑ *</td>
<td>↑ *</td>
<td></td>
</tr>
<tr>
<td>Movement</td>
<td>↑ *</td>
<td>↑ *</td>
<td>↑</td>
<td>↑</td>
<td></td>
</tr>
<tr>
<td>Touch</td>
<td>↑</td>
<td>↑ *</td>
<td>↑</td>
<td>↑</td>
<td></td>
</tr>
</tbody>
</table>

† Indicates an increase in interactions over time
↓ Indicates a decrease in interactions over time
* Indicates significant change over time at \(\alpha=.01\)

Comparing the two M&M groups, Table 5.4 shows the M&M-Only group significantly increased for all five types of interactions over the 5-week period whereas the M&M-F2F group showed significant increases only for two – Music and Enjoyment, and Movement. Comparing the two No M&M groups both had the same insignificant changes for Play, Movement, and Touch, and a similar significant increase in Social. The only difference was a significant decrease in the F2F-Only group’s Music and Enjoyment of Interactions but no significant change for the Control group.
Together, the combined ANOVA results and the post-hoc t-tests show that that over the 5-week period:

1. M&M alone significantly increased mothers’ Music and Enjoyment, and Movement Interactions with their infants over time.
2. F2F contact alone significantly decreased mothers’ Play Interactions and increased their Touch Interactions over time.
3. There was no significant interaction of F2F contact x M&M or Time x F2F x M&M, although, as can be seen in Table 5.3, it was the M&M-Only group that showed significant increases for all five types of interactions, while the M&M F2F group only did so for two types of interactions.

5.4.3. The Effects of Music and Movement and Face-to-Face-contact on Maternal Well-Being

Results regarding maternal well-being will be presented according to the effects of the same independent variables reported in Section 5.4.2 – M&M and F2F contact as group factors and pre- and post-test as a within-subject variable. Maternal Well-being was measured according to three scales: the Maternal Attitudes Questionnaire (MAQ), Parenting Stress Index/Short Form (PSI/SF) and Maternal Postnatal Attachment Scale (MPNAS). The Edinburgh Post-Natal Depression Scale (EPDS) was used for the purpose of screening for post-natal depression to ensure the data represented a sample of non-clinical first-time mothers. A Split-Plot ANOVA design was applied for analysis to the pre- and posttest results of each of these three scales to examine the effects of Time, M&M and F2F contact.

5.4.3.1 The Edinburgh Post-Natal Depression Scale (EPDS)

The pre- and post-test results\(^{40}\) for the four groups are graphically represented in Figure 5.6 showing the pretest means scores ranged from 5.5 (SD=3.4) to 6.6 (SD=4.2) and post-test means scores from 4.3 (SD=3.3) to 5.1 (SD=4.0). Thus all four groups were (both at pre- and post-test) within the low risk category for postnatal depression (i.e., 9 or less).

\(^{40}\) CD Appendix 9 Statistical output of EPDS
There was a significant main effect of Time \([F(1, 92) = 15.241, p = .000, \text{ partial } \eta^2 = .142]\) but no significant interaction of Time with any of the other factors, nor any between-subjects effects of M&M, F2F contact, or M&M x F2F. These results show that over the 5-week period the mothers’ Edinburgh Postnatal Depression Scale scores decreased as a function of Time.  

5.4.3.2 Maternal Attitudes Questionnaire (MAQ)

The pre- and post-test scores for the MAQ for the four groups are graphically represented in Figure 5.7. The pretest mean scores ranged from 2.2 (SD=1.8) to 4.0 (SD=3.0) and the post-test means scores ranged from 2.0 (SD=1.9) to 3.5 (SD=3.3). These scores indicate that the mothers were not within a risk category of maladaptive cognitions concerning motherhood with mean scores being less than 6.3.

41 Based on the research of Matthey (2004), a decrease of \( \geq 4 \) on the EPDS is classified as clinically significant.
Figure 5.7 Maternal Attitudes Questionnaire pre- and post-test mean scores for individual groups. Error bars represent standard error of the mean.

Results showed that there was a significant effect of Time \([F(1, 92) = 16.252, p = .000, \text{partial } \eta^2 = .150]\) and significant interaction of Time x M&M \([F(1, 92) = 4.555, p = .035, \text{partial } \eta^2 = .047]\). There was no significant interaction of F2F with Time but there was a significant between-subjects effect of F2F contact x M&M \([F(1, 92) = 4.036, p = .047, \eta^2 = .042]\). There was no significant interaction of Time x M&M x F2F contact.

In summary, mean scores generally decreased over the 5 week period but the significant interaction of Time x M&M showed that the decrease was significantly greater for those groups who did not have M&M – the F2F-Only, and the No treatment Control groups.

**5.4.3.3 Parenting Stress Index/Short Form (PSI/SF)**

The Total Stress score (as calculated from the sum of scores from the three domains Parental Distress, Parent-Child Dysfunctional Interaction and Difficult Child) can range from 36 (low) to 180 (high). Pre- and post-test results for the four groups are graphically represented in Figure 5.8. The mean scores for all groups decreased.

---

42 CD Appendix 10 Statistical output for MAQ results and output of correlation results for MAQ and EPDS.

Section 5.3.5 discussed scores of the MAQ to be highly correlated with those of the EPDS. Mean score results of this study showed a strong positive correlation between the MAQ and the EPDS. Using Pearson product-moment correlation coefficient, the pretest and posttest correlation results of the two scales were \(r = .489, n = 96, p = .000\), and \(r = .513, n = 96, p = .000\) respectively.

43 CD Appendix 11 Statistical output of PSI/SF results
over the 5-week period with the pretest mean scores ranging from 64.1 (SD=14.6) to 71 (SD=16.5) and the post-test means scores ranging from 59.7 (SD=11.8) to 66.8 (SD=15).

![Graph showing Total Stress pre- and post-test mean scores for individual groups. Error bars represent standard error of the mean.](image)

**Figure 5.8** Total Stress pre- and post-test mean scores for individual groups. Error bars represent standard error of the mean.

Results showed a significant decrease as a function of Time \[F(1, 92) = 21.436, p = .00, \text{partial } \eta^2 = .198\] but no other significant main effects or interactions. Similarly, the results for each of the three separate domains showed significant main reductions over Time \[\text{Parental Distress}, F(1, 92) = 10.006, p = .002, \text{partial } \eta^2 = .098; \text{Parent-Child Dysfunctional Interaction}, F(1, 92) = 29.987, p = .000, \text{partial } \eta^2 = .246; \text{Difficult Child}, F(1, 92) = 15.669, p = .000 \text{ partial } \eta^2 = .146\] with no other significant main effects or interactions.

In summary, results indicate that mothers did not experience undue stress associated with parenting and that scores over the 5-week period improved (decreased) equivalently for all groups.

### 5.4.3.4 Maternal Post-Natal Attachment Scale (MPNAS)

Results\(^{44}\) presented are of the three individual domains *Quality of Attachment, Absence of Hostility, Pleasure of Interactions* and of the *Total Attachment*. Alpha of .01 was applied as Levene’s test showed there was a violation of the homogeneity of variance for posttest results of *Total Attachment* and *Pleasure of Interactions*.

\(^{44}\) CD1 Appendix 12 Statistical output of Split-plot ANOVA results for Maternal Postnatal Attachment
The *Quality of Attachment* pre-and post-test mean scores are graphically represented in Figure 5.9.

![Quality of Attachment graph](image)

*Figure 5.9* Quality of Attachment pre- and post-test mean scores for individual groups. Error bars represent standard error of the mean.

There was a significant main effect of Time \([F(1, 92) = 44.130, \ p = .000, \ \text{partial } \eta^2 = .324]\) and significant interactions of Time x M&M \([F(1, 92) = 62.998, \ p = .000, \ \text{partial } \eta^2 = .406]\) illustrating increases over time for both M&M groups compared with reductions for the F2F-Only, and little change for the Control group. There was no significant interaction of Time x F2F contact or Time x M&M x F2F contact, nor were there between-subject effects of F2F contact x M&M.

The *Absence of Hostility* pre-and post-test mean scores are graphically represented in Figure 5.10. There was a significant main effect of Time \([F(1, 92) = 8.427, \ p = .005, \ \text{partial } \eta^2 = .084]\) and a significant interaction of Time x M&M \([F(1, 92) = 20.401, \ p = .000, \ \text{partial } \eta^2 = .182]\). There was no significant interaction of Time x F2F contact or Time x M&M x F2F contact for these domains. Nor were there between-subject effects of F2F contact x M&M. These results indicate an increase in absence of hostility for both the M&M groups compared with a decrease for the F2F-Only group and no change for the Control group.
Figure 5.10 Absence of Hostility pre- and post-test mean scores for individual groups. Error bars represent standard error of the mean.

Figure 5.11 graphically illustrates the Pleasure of Interaction pre- and post-test mean score results. There was no significant main effect of Time but a significant interaction of Time x M&M [F(1, 92) = 17.429, p = .000, partial \( \eta^2 = .159 \)] and a significant between-subjects effect of M&M [F(1, 92) = 4.294, p = .041], but no significant interactions of Time x F2F contact or Time x M&M x F2F contact and no between-subjects effects of F2F contact x M&M. These results show that the groups that had M&M, the M&M-F2F and M&M-Only, increased the pleasure of their interactions over time, while those who did not experience M&M, F2F-Only and Control, actually decreased in the pleasure of their interactions over time.

Figure 5.11 Pleasure of Interaction pre- and post-test mean scores for individual groups’ results. Error bars represent standard error of the mean.
Figure 5.12 illustrates the pre- and post-test mean scores for Total Attachment. There was both a significant main effect of Time \( [F(1, 92) = 25.308, p = .000, \text{partial } \eta^2 = .216] \) and significant interactions of Time x M&M \( [F(1, 92) = 76.172, p = .000, \text{partial } \eta^2 = .453] \) but no significant difference for Time x F2F contact or Time x M&M x F2F contact and no between-subjects effects of F2F x M&M. These results show that, as for Pleasure of Interactions, Total Attachment increased over time for the M&M groups but decreased or remained relatively unchanged for the No M&M groups.

![Total Attachment graph](image)

*Figure 5.12 Total Attachment* pre- and post-test mean scores for individual groups’ results. Error bars represent standard error of the mean.

Table 5.5 gives a summary of the significant results for the three elements and the total of the Maternal Post-Natal Attachment Scale.

**Table 5.5**
The effects of Time, M&M and F2F contact on Maternal Post-Natal Attachment

<table>
<thead>
<tr>
<th>ATTACHMENT DOMAIN</th>
<th>TIME</th>
<th>TIME x M&amp;M</th>
<th>TIME x F2F Contact</th>
<th>M&amp;M x F2F Contact</th>
<th>TIME x F2F Contact x M&amp;M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Attachment</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Absence of Hostility</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Pleasure of Interactions</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Total</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

✓ Indicates significant result ✗ Indicates no significant result

* Indicates significant change over time at \( \alpha = .0125 \)
As can be seen the Time x M&M factor is significant for all elements, and the Time x F2F effects are all insignificant. Thus it is the M&M portion of the program *per se* that affects postnatal attachment – face-to-face interaction with the instructor is not necessary.

To investigate these results further, post-hoc t-tests were conducted on pre- vs. post-test scores for each group on each of the dependent variables. As there were multiple t-tests, one set for each dependent variable, the alpha rate (0.05) was adjusted by dividing by the number of dependent variables (4), giving an alpha of 0.0125. (Note no adjustment for groups’ factor is required as groups was a between-subjects factor, and so different samples were involved). The results are shown in Table 5.6.

Table 5.6
*Maternal Postnatal Attachment Scale results according to the increase/decrease of mean scores over the 5-week period as calculated by paired samples t-tests*

<table>
<thead>
<tr>
<th>ATTACHMENT DOMAIN</th>
<th>GROUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M&amp;M-F2F</td>
</tr>
<tr>
<td>Quality of Attachment</td>
<td>↑*</td>
</tr>
<tr>
<td>Absence of Hostility</td>
<td>↑*</td>
</tr>
<tr>
<td>Pleasure of Interactions</td>
<td>↑*</td>
</tr>
<tr>
<td>Total</td>
<td>↑*</td>
</tr>
</tbody>
</table>

↑ Indicates an increase  ↓ Indicates a decrease  * Indicates significant change over time at α = .0125

It can be seen that there was an increase in all aspects of maternal attachment only as an effect of M&M. Indeed, when M&M was absent there was actually a decrease in maternal attachment: in the F2F-Only group there were decreases in all three domains, and two of these decreases were significant; and in the Control group there were non-significant decreases in all three domains. So, not only is F2F not necessary for improvements in maternal attachment, but lack of M&M actually results in decreases in maternal attachment.

5.4.3.5 Summary - Maternal Well-Being
A summary of the results from the EPDS, MAQ, PSI/SF and MPNAS according to the factors of Time, M&M and F2F contact is presented in Table 5.7.
Table 5.7
Maternal Well-being results according to the effects of Time, M&M and F2F contact

<table>
<thead>
<tr>
<th>MEASUREMENTS OF MATERNAL WELL-BEING</th>
<th>TIME</th>
<th>TIME x M&amp;M</th>
<th>TIME x F2F CONTACT</th>
<th>M&amp;M x F2F CONTACT</th>
<th>TIME x F2F CONTACT x M&amp;M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postnatal Depression</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Maternal Attitudes</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Parenting Stress</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Maternal Postnatal Attachment</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

✓ Indicates significant result
✗ Indicates no significant result

Summarising Table 5.7, the results indicate that over the 5-week period;
1. M&M significantly facilitated mothers’ Maternal Postnatal Attachment. Mothers in the two No M&M groups showed a decline in Maternal Postnatal Attachment.
2. The lack of M&M had a significant effect on mothers’ MAQ results. The No M&M groups’ mean scores reduced more so compared to the M&M groups’ mean scores over the 5 weeks. There was also a significant between-subjects effect of F2F x M&M for MAQ indicating a difference in the combined mean scores of the M&M groups compared to the F2F groups.
3. F2F contact had no significant effect on maternal well-being
4. There was no significant effect of Time x F2F x M&M.

5.4.4 Evaluation of the M&M program
The results of the Program Evaluation questionnaire are presented with respect to three research questions:

1. What were the benefits of participation in the M&M program for the mothers in their parenting role and the relationship with their infants?
2. Were there specific aspects of the M&M program that mothers regard as beneficial when engaging with their infants?
3. Do the program evaluation results of the M&M-F2F group differ to those of the M&M-Only group?

Firstly, the qualitative data referring to M&M participation benefits and the program content are reported, and group comparisons will also be presented. Then, the statistical results of M&M-F2F and M&M-Only group evaluations of the program...
are presented using factor analysis for data reduction, and independent t-test analyses to compare the two M&M groups.

5.4.4.1 M&M Program Benefits – Qualitative Results

Mothers’ responses to the open-ended questions regarding participation benefits were coded by the researcher into ad hoc categories based on the content of the answers, and frequencies of responses scored. Below are the items to which mothers responded and tables displaying the frequencies of responses and percentage calculations for each M&M group, and differences that occurred between the groups.

1. Describe how the program assisted you with the use of music and movement with your infant

Table 5.8 shows that both groups’ responses indicated two main benefits of the program: (i) increasing the repertoire of games to play with the baby, and (ii) increasing their repertoire of songs to sing.

Table 5.8

<table>
<thead>
<tr>
<th>Coded Answers</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provided repertoire of musical games to play with baby</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>Frequency</td>
<td>79.2%</td>
<td>54.2%</td>
</tr>
<tr>
<td>2. Jogged memory/broadened range of songs to sing</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Frequency</td>
<td>58.3%</td>
<td>66.7%</td>
</tr>
<tr>
<td>3. Broadened ideas about different types of music to use/dance with baby</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Frequency</td>
<td>20.8%</td>
<td>45.9%</td>
</tr>
<tr>
<td>4. Developed confidence in being creative when entertaining baby</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Frequency</td>
<td>0%</td>
<td>29.2%</td>
</tr>
<tr>
<td>5. Introduced variety of movement/dance with baby</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Frequency</td>
<td>4.2%</td>
<td>20.8%</td>
</tr>
<tr>
<td>6. Encouraged communication using voice</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Frequency</td>
<td>12.5%</td>
<td>12.5%</td>
</tr>
<tr>
<td>7. Provided skills for soothing the baby</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Frequency</td>
<td>16.7%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Although both groups’ responses show the program broadened their use of different types of music, the M&M-Only group responded with greater frequency on this item than the M&M-F2F group. In addition, the M&M-Only group responded with greater frequency than the M&M-F2F group to developing confidence in being
creative with their interactions, and for introducing a variety of movement/dance styles with their infant

2. Describe how you may have benefited from the program in other ways not already mentioned

Table 5.9 shows the additional benefits for the M&M-F2F group mothers were; (i) meeting other mothers, (ii) socialising of the babies, and (iii) developing confidence with their infants. The M&M-Only group’s responses also showed some evidence of developing confidence with their infants, as was evident in the results of Table 5.8. The main benefits reported by the M&M-Only group mothers were; (i) lifting mood and relaxation, and (ii) learning about infant development using music and movement.

Table 5.9

*Coded answers, frequency scores and percentage calculations for responses to the item, ‘Describe how you may have benefited from the program in other ways not already mentioned’.*

<table>
<thead>
<tr>
<th>Coded Answers</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>1. Meeting other mothers</td>
<td>13</td>
<td>54.2</td>
</tr>
<tr>
<td>2. Socialising of the babies</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>3. Developed confidence and creativity in what I do with my baby</td>
<td>10</td>
<td>41.6</td>
</tr>
<tr>
<td>4. Being in a supportive learning environment</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>5. Lifting mood/Relaxing for mother</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>6. Learning about infant development by using music &amp; movement</td>
<td>2</td>
<td>8.3</td>
</tr>
<tr>
<td>7. Teaching my partner/ sharing music together with baby</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>8. Breaking feeling of isolation</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>9. Learning patience with baby</td>
<td>2</td>
<td>8.3</td>
</tr>
</tbody>
</table>

3. Describe how you and your baby may have benefited from the program in other ways not already mentioned in the questionnaire.

Table 5.10 shows three benefits: (i) mother-infant bonding, with a greater frequency occurring for M&M-F2F group, (ii) increasing the time that mother and infant spent
interacting, with a greater frequency occurring for M&M-F2F group, and (iii) joyful reciprocal dyadic interactions, with a greater frequency occurring for M&M-Only.

Table 5.10

*Coded answers, frequency scores and percentage calculations for responses to the item, ‘Describe how you and your baby may have benefited from the program in other ways not already mentioned in the questionnaire’.*

<table>
<thead>
<tr>
<th>Coded Answers</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>1. Mother-infant bonding</td>
<td>13</td>
<td>54.2</td>
</tr>
<tr>
<td>2. Increasing time I spent interacting with my baby</td>
<td>10</td>
<td>41.7</td>
</tr>
<tr>
<td>3. Reciprocating happiness between mother and baby</td>
<td>9</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Both M&M groups were questioned about their preferences for the methods of program instruction (Question 14, Appendix A10). The M&M-F2F group were asked if: (i) participation in the face-to-face group instruction method was of benefit to them, or (ii) a self-instruction method would have been preferred, or (iii) both types of programs would have been equivalent. Similarly, the M&M-Only group were asked if; (i) the self-instruction method was of benefit to them, or (ii) a group instruction method would have been preferred, or (iii) both types of programs would have been equivalent. Table 5.11 shows the results.

Table 5.11

*Frequency scores and percentage calculations of responses to group preferences for program instruction method.*

<table>
<thead>
<tr>
<th>Preference for Instruction Method</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>1. A face-to-face group participation program</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>2. A self-instruction program</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3. Either type of instruction method would have been of equal benefit.</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

All the M&M-F2F group mothers had no other preference for participation than that of the face-to-face group instruction method. The M&M-Only group mothers’ responses showed some variation. The majority preferred the self-instruction method, with four mothers nominating the face-to-face method as a possible preference and two mothers indicating no preference.
5.4.4.2 The M&M Program Content - Qualitative Results

Mothers’ responses in relation to the content of the M&M program were coded and the tables below show the results for each M&M program group.

1. Was the content of the program adequate, too much or too little?
Table 5.12 shows equivalent results for both M&M groups, with the majority of mothers nominating that the content of the program was adequate.

Table 5.12
Frequency scores and percentage calculations for responses to the item, ‘Was the content of the program adequate, too much or too little?’

<table>
<thead>
<tr>
<th>Responses</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Adequate</td>
<td>22</td>
<td>91.7</td>
</tr>
<tr>
<td>Too much</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Too little</td>
<td>2</td>
<td>8.3</td>
</tr>
</tbody>
</table>

2. Describe specific activities that were beneficial for you and your baby
As displayed in Table 5.13, both the M&M-F2F and M&M-Only groups showed a greater frequency of responses for using the rhymes and songs associated with knee jogging and trotting activities than other activities.

Table 5.13
Coded answers, frequency scores and percentage calculations for responses to the item, ‘Describe specific activities that were beneficial for you and your baby’.

<table>
<thead>
<tr>
<th>Coded responses</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only(N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>1. Knee jogging and trotting activities</td>
<td>13</td>
<td>54.2</td>
</tr>
<tr>
<td>2. Tickly games</td>
<td>8</td>
<td>33.3</td>
</tr>
<tr>
<td>3. Relaxation music/lullabies</td>
<td>10</td>
<td>41.7</td>
</tr>
<tr>
<td>4. Singing nursery rhymes</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>5. Dancing</td>
<td>7</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Both groups also showed some preference for tickly games. Differences occurred with the M&M-F2F group showing a greater frequency for using the relaxation music/lullabies genre than did the M&M-Only group. The M&M-Only group showed preference for singing nursery rhymes.
3. Name specific pieces of music/songs that were beneficial to you and your baby?

Table 5.14 shows that in general, up-tempo playsongs/instrumental music (titles numbered from 1-5) were preferred by both groups. The M&M-F2F group’s preferences were *Gregory Griggs* (knee jogging/ trotting) and *Singing in the Kitchen* (singing, clapping, dancing and ‘noise making’) with the *Nursery Rhyme Medley* (hand actions and dancing) being nominated by both groups. The use of music for relaxation (titles numbered from 6-12) was preferred more by the M&M-F2F group than by the M&M-Only group.

Table 5.14

*Coded answers, frequency scores and percentage calculations for responses to the item, ‘Name specific songs/pieces of music that were beneficial to you and your baby’*

<table>
<thead>
<tr>
<th>Title of song/instrumental music</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>1. Gregory Griggs (s)</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>2. Singing in the kitchen (s)</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>3. Nursery rhyme medley (s)</td>
<td>9</td>
<td>37.5</td>
</tr>
<tr>
<td>4. A medley (I)</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>5. Splish Splosh Splash (s)</td>
<td>8</td>
<td>33.3</td>
</tr>
<tr>
<td>6. Have I told you lately that I love you (s)</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>7. On wings of song (I)</td>
<td>5</td>
<td>20.8</td>
</tr>
<tr>
<td>8. She never knew you (I)</td>
<td>5</td>
<td>20.8</td>
</tr>
<tr>
<td>9. Brahms’ lullaby (I)</td>
<td>5</td>
<td>20.8</td>
</tr>
<tr>
<td>10. Hold me in your arms (s)</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>11. Tennesse waltz (s)</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td>12. Gabrielle’s oboe (I)</td>
<td>3</td>
<td>12.5</td>
</tr>
</tbody>
</table>

(s) indicates *song*

(I) indicates *instrumental piece*

4. Can you describe your infant’s reactions when you used the M&M activities with him/her?

Table 5.15 shows both M&M groups reported that their infants’ laughed and squealed more frequently than other behaviours. Infants’ vocalising with their mothers occurred more so with the M&M-Only group than the M&M-F2F group.
Table 5.15

_Coded answers, frequency scores and percentage calculations for responses to the item, ‘Describe your infant’s reactions when engaging in M&M activities’_

<table>
<thead>
<tr>
<th>Coded Answers</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Laughed/squealed</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>2. ‘Singing’/vocalising with mother</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>3. Calmed the baby</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>4. Excited baby with arm/legs moving</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5. Excitement in face when anticipating mother’s singing and actions</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

5. For what purpose did you use the tape?

Table 5.16 shows both the groups’ main use for the tape was to accompany the mothers’ singing and use of rhymes during playtime. Both groups also showed equivalent use of the tape for calming the infants. In addition, the M&M-F2F group’s responses show they were more likely to use the tape when dancing, and for entertainment when driving in the car than the M&M-Only group.

Table 5.16

_Coded answers, frequency scores and percentage calculations for responses to the item, ‘For what purpose was the tape used?’_

<table>
<thead>
<tr>
<th>Coded Answers</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only(N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accompaniment for playtime rhymes and singing</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Calming the baby</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Dancing</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Entertainment in the car</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>During bath time</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

6. How often did you use the tape?

Table 5.17 shows that in general, mothers of both groups used the audio-tape a few time a week.
Table 5.17

Table 5.17: Group frequency scores and percentage calculations according to how often the M&M program’s audio-tape was used

<table>
<thead>
<tr>
<th>The tape was used;</th>
<th>M&amp;M-F2F (N=24)</th>
<th>M&amp;M-Only (N=24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>A few times a week</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Every day</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Once a week</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

5.4.4.3 The M&M Groups’ Evaluation Comparisons - Statistical Results

To determine if there were statistical differences between the groups’ data, factor analysis was applied to the 10 likert scale items of the M&M Program Evaluation (see Appendix A10). For reasons discussed in 5.4.2, the Principal Axis Factoring (PAF) technique and Direct Oblimin rotation were applied and three factors were extracted (see Table 5.8) with initial eigenvalues exceeding 1. The three factors explain a total of 55.53% of the variance. The Kaiser-Meyer-Olkin Sampling Adequacy (KMO) value was .733 and the Barlett’s Test of Sphericity reached statistical significance of p<.001 which supports the factorability of the correlation matrix.

Table 5.18 shows the 10 variables and the factor titles. Variables of the first factor, *Increase of M&M repertoire & Enjoyment*, were associated with mothers’ increased repertoire of M&M activities and the increased enjoyment of sharing time with their infants. The second factor, *Program Content*, was associated with mothers rating the usefulness of the program’s content. The variable ‘All program content’ which loaded negatively, indicated mothers’ use of the complete content of the program. ‘Some program content’ indicated only certain genres of the program were utilised. The third factor, *Mother-Infant Benefits*, was associated with mothers’ perceptions of what they had gained as a parent and the impact the participation had on the relationship with their infants.

Independent samples t-tests were used for comparing the mean factor scores of the two M&M groups. There was no significant difference between the two groups for any of the three factors [M&M Repertoire and Enjoyment, $t(46)=1.130$, $p = .264$;

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45 CD Appendix 14 Statistical output of Factor analysis of Program Evaluation
46 CD1 Appendix results 15 Statistical output of Independent t-test for M&M groups program evaluations
Program Content, \( t(46) = -1.656, p = .105 \); Mother-Infant Benefits, \( t(46) = -.206, p = .838 \)]. This means that both groups were equivalent with their rating of (i) the M&M intervention increasing their repertoire and enjoyment of M&M activities to share with their infant, (ii) using either the whole program or certain sections of the program, and (iii) benefits associated with mother and infant well-being.

Table 5.18

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor Title</th>
<th>Increase of M&amp;M Repertoire &amp; Enjoyment</th>
<th>Program Content</th>
<th>Mother-Infant Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase of musical game repertoire</td>
<td></td>
<td>.844</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase of song repertoire</td>
<td></td>
<td>.799</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase of movement repertoire</td>
<td></td>
<td>.682</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase of mother baby enjoy activities</td>
<td></td>
<td>.635</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase of mother baby enjoying time</td>
<td></td>
<td>.537</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness of recorded music</td>
<td></td>
<td>.325</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All program content</td>
<td></td>
<td>-.982</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some program content</td>
<td></td>
<td>.731</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother &amp; baby benefits</td>
<td></td>
<td>.824</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother benefits</td>
<td></td>
<td>.746</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


5.4.4.4 Summary - Evaluation of the M&M program

Mothers’ evaluations of the M&M program are summarised according to the three research questions posed in section 5.4.4.

1. Benefits of participating in the M&M program for the mothers in their parenting role and for the relationship with their infants.

The main benefits perceived by the mothers of both M&M groups were: (i) increasing the repertoire of songs to sing, games to play, and ideas for using music
with their infants, (ii) mother-infant bonding, (iii) increasing the time that mother and infant spent interacting, and (iv) joyful reciprocal dyadic interactions.

Participation benefits also varied between the groups. The M&M-F2F group reported benefits of (i) meeting other mothers, and (ii) socialising of the babies. The M&M-Only group reported benefits of (i) assisting them in lifting their mood and relaxation, and (ii) learning about infant development and integrating the use of music and movement.

2. Specific aspects of the M&M program that mothers regarded as beneficial when engaging with their infants.
Overall, mothers of both M&M groups reported the quantity of content of the program to be sufficient for participation over the 5-week period. Up-tempo activities of knee jogging, gallop type dancing, tickly games and singing playsongs were shown to be preferred by both groups when engaging their infants in interactions. Both groups also reported that music was used for relaxation with the infants. The audio-tape of program music was used largely as an accompaniment during interactions with the infants, and on the whole, was used a few times a week.

3. Comparison of the M&M groups’ evaluations.
The statistical comparison of the results showed the groups were equivalent for the three factors, Increase of M&M Repertoire & Enjoyment, Usefulness of the Program Content, and Mother-Infant Benefits.

The qualitative differences that were reported showed the social contact benefits gained by the M&M-F2F group from meeting other mothers and infants and being in a supportive learning environment. The M&M-Only group reported learning about infant development and the importance of interacting with infants using music and movement activities.

Additional qualitative results of the MIMI open-ended questions and a summary are reported in CD Results Appendix 1.
5.4.5 Summary of Main Findings in Relation to Predictions

Following are a summary of the main findings in relation to the predictions presented in section 5.2.

5.4.5.1. Effect of M&M and F2F contact on the Frequency of Mothers' Interactions with their Infants

It was predicated that:

(1) M&M (independent of F2F contact) would significantly increase the frequency of mothers’ interactions with their infants. Results partially supported this prediction with ‘Music and Enjoyment of Interactions’ and ‘Movement Interactions’ increasing significantly for mothers in the two M&M groups compared to the No M&M groups. Moreover there were no significant M&M x F2F x Time effects showing that there were no greater M&M effects in the M&M-F2F group than in the M&M-Only group. Results of t-tests found that if anything, the M&M-Only group showed greater effects of not having face-to-face contact. For this group there were increases over time for all five dependent variables, whereas for the M&M-F2F there were increases only for two of the five variables. The M&M-F2F method had no influence on mothers’ touch, social, or play interactions with their infants whereas M&M-Only did.

(2) F2F contact (independent of M&M) would significantly increase the frequency of mothers’ interactions with their infants. Results did not support this prediction. In fact the opposite was more the case; for ‘Play’ and ‘Touch’ interactions the lack of F2F actually increased scores over time, especially in the M&M-Only group.

(3) An interaction effect of F2F contact on M&M would occur, with the M&M-F2F mothers increasing their interactions with their infants more so than the mothers’ of the M&M-Only group. Results did not support this prediction; there was no interaction effect of F2F contact on M&M. Thus M&M-Only had an equivalent effect on mothers’ behaviour as did M&M-F2F. The added F2F component appears not to be necessary.
5.4.5.2. Effect of M&M and F2F contact on Maternal Well-being

It was predicted that:

1. M&M (independent of F2F contact) would significantly improve maternal well-being. Results partially supported this prediction. M&M had a significant positive effect on mothers’ overall attachment to their infants, showing an improvement for the mothers in the two M&M groups and a decline for those in the No M&M groups. For both stress and depression there was a general decrease over time for all four groups and no differential effect due to presence or absence of M&M. However, for maternal attitudes, results showed a greater improvement for the No M&M groups than the M&M groups.

2. The effects of F2F contact (independent of M&M) would significantly improve maternal well-being. Results did not support this prediction. The presence of F2F contact had no significant effect on maternal well-being.

3. An interaction effect of F2F contact on M&M would occur. Results did not support this prediction. The effects due to M&M as shown in 1 above were the case, independent of F2F contact.

5.4.5.3 Program Evaluations

It was predicted;

1. In relation to benefits of the program, mothers of both M&M groups would report that the program increased their enjoyment of interactions with their infants and increased their repertoire of M&M activities. Results supported these predictions. In addition, results showed mothers perceived that a closer bond with their infants had been gained as an effect of practicing M&M activities. It was also predicted the M&M-F2F group would report the benefits of social networking with other first-time mothers and their infants, which was supported by the results. Although not predicted, the M&M-Only group reported additional participation benefits associated with lifting their mood state and relaxation, and learning about using music and movement to facilitate infant development.

2. The up-tempo M&M activities that promote fun between the mother and infant were likely to be practiced more than other activities. Results of both M&M groups supported this prediction. Results also suggested that both groups showed they used music for relaxation with their infants.
(3) The overall mother-infant benefits would show a significant difference between the groups, with the M&M-F2F group reporting greater benefits than the M&M-Only group. Statistical results did not support this prediction.
CHAPTER 6

Discussion of Results of Study 1: Implications for Further Investigation
This chapter discusses the findings of Study 1 and incorporates interpretations supported by literature presented in the literature of Chapters 1 to 4. Firstly, the effects of music and movement (M&M) and face-to-face contact (F2F) on the frequency of the first-time mothers’ interactions with their infants will be discussed followed by effects on maternal well-being. The M&M groups’ evaluation results of the program will be discussed according to the similarities and differences of the implementation methods. The role of M&M as a program of intervention devised to enhance first-time mothers’ communicative interactions with their infants will also be discussed. Limitations to the design of Study 1 will be acknowledged and the chapter will conclude with a discussion of the need for further investigation into the effects of M&M on first-time mothers’ behavioural interactions with their infants.

6.1 Mothers’ Interactions with Their Infants

6.1.1 Music and Movement Interactions

As predicted (based on the previous research of Vlismas and Bowes, 1999), results of the self-reported data showed M&M significantly increased mothers’ self-reported frequency of Music and Enjoyment of Interactions and Movement Interactions with their infants. Both M&M groups’ increases were equivalent, thus there was no effect of F2F contact, which was not predicted. Based on the literature regarding the influence of social support in the role of parenting (see section 1.3.1) it was thought that mothers receiving F2F contact would increase more so than mothers without this type of social contact.

The Music and Enjoyment of Interactions factor included four variables – mothers’ own enjoyment of music, their enjoyment of using music to interact with their infants, singing to their infants, and using music for relaxation with their infants. The group results of each of these variables (see CD1 Appendix 4) showed equivalent increases for both M&M groups over the 5 weeks. M&M mothers not only increased their frequency of using music activities with their infants but their own enjoyment of music and enjoyment of using music with their infants increased. The No M&M groups’ results of Music and Enjoyment of Interactions showed a decrease, which was significant for the F2F-Only group. These results were reflected in the qualitative results of the MIMI questionnaire (see CD1 Appendix 1) that showed
both M&M groups reported a broadening of the genres of music they enjoyed to include children’s songs (nursery rhymes, lullabies and playsongs) and in particular, these groups reported an increase in the frequency of using music activities to play with their infants. These results were supported by the M&M groups’ evaluations of their participation in the program (see section 5.4.4.1) which indicated 79% of the M&M-F2F mothers and 54 % of the M&M-Only mothers reported a benefit from their increase in the repertoire of playful music activities to be used with their infants. The M&M-Only group showed further increases with their use of music for relaxation, entertainment around the house, and singing (reported in the MIMI questionnaire). The No M&M groups’ qualitative results from the MIMI questionnaire showed the F2F-Only group reported a decrease in their enjoyment of using music for entertainment around the house and music for relaxation during the 5-week period. The No Treatment Control group’s qualitative results indicated a marked reduction in their use of music to comfort their infants.

From these results it appears that providing first-time mothers with a variety of music genres to use for their own enjoyment and to use with their infants during their caregiving day increases the frequency and enjoyment of mother-infant music interactions. Without the encouraged use of M&M, mothers decrease the frequency of music interactions with their infants over time. Such results appear to reflect a reciprocal effect of mothers’ and infants’ enjoyment of sharing the musical activities.

Although the Movement Interaction factor results showed there was a significant effect of M&M, the No M&M groups also increased their movement interactions with their infants over the 5-week period. Section 5.4.2 discussed the loading of variables for the Movement Interaction factor. As this factor not only included mothers use of dance but also mothers taking their infants for a walk, results could have been more reflective of this latter item than those related to dance. This appears to have been so for The No M&M groups’ results showing mothers increased the frequency of taking their infants for an outdoor walk and not from the increase in their use of dance, as was shown by the mean scores of Movement Interaction factor variables of ‘taking the infants for a walk’, ‘mothers’ own enjoyment of dancing’ and ‘dancing with their infants’ (see CD Appendix 7). Supporting these results were those of the MIMI qualitative data showing the frequency of scores associated with
dancing activities for the F2F-Only and Control groups remained unchanged for some items and slightly decreased for other items. Both M&M groups increased their own enjoyment and use of dance with their infants but also increased slightly in their outdoor exercise of taking the infant for a walk. In addition to these results, the M&M Program Evaluation results indicated both groups increased their rhythmical movement repertoire by engaging their infants using knee jogging and ‘gallop’ actions that accompanied playsongs and rhymes. So it appears the variety of genres provided in the M&M program not only increases mothers’ music interactions with their infants but also increases their dance and rhythmical movement interactions. Without this stimulus the first-time mothers decreased their use of dance and rhythmical movement interactions with their infants.

It was proposed in section 3.4 that encouraging mothers’ music interactions with their infants could potentially increase the frequency of mothers’ movement interactions with their infants. This was based on the research of Dissanayake (2000), Longi and Karmiloff-Smith (2004) and Mechthild Papoušek (1996) who reported that mothers’ use of music with their infants coexists with the coordination of rhythmical movement. This suggests that when mothers interact with their infants using music they naturally accompany these interactions with movement. Thus, the M&M mothers’ increased use of music and the enjoyment of interactions with their infants could well have positively influenced their rhythmical movement interactions with their infants. It could also be argued that as the program of activities was devised to enhance the frequency of mothers’ music and rhythmical movement interactions with their infants that the mothers, as enthusiastic research participants, merely conformed to the expectations of the study. Furthermore, demand characteristics of the questionnaires associated with mothers’ music and movement interaction with their infants could have affected results. While these factors need to be considered as an influence on the M&M mothers’ results, they cannot contribute to interpreting the results of the No M&M groups’ decreased use of both music and rhythmical movement activities with their infants. It could be these latter results provide further evidence that music and movement could be inseparable as communicative mediums. It is therefore possible that providing mothers with different genres of music to use with their infants in itself may be a catalyst to inspire their use of rhythmical movement.
The increase of music and rhythmical movement interactions may well have assisted the infants of the M&M groups in becoming synchronous with the mothers’ tempo and rhythms, and as a result enhanced the bond of mother and infant (Hatch & Maietta, 1991) as discussed in section 3.4. In addition to the dyadic effect that such movement interactions can have, mother and infant engaging in rhythmical body movement arouses pleasure for the infant (Hodges, 1996). Infants’ display of pleasure during mothers’ music and rhythmical movement interactions was evident from the qualitative results of the M&M Program Evaluation questionnaire. Predominantly mothers reported their infants laughed and squaled while engaging in M&M activities, with some mothers reporting their infants coordinated their arm and leg movements with their excitement during interactions.

Infants’ facial and vocal expressions of excitement and happiness accompanied by strong rhythmical movement such as kicking their feet and clapping/shaking their hands have been found to be the predominant behaviours displayed when mother and infant reach a state of affect attunement (Jonsson & Clinton, 2006; and see section 2.2.2). If it is to be suggested that the mother and infant relationship benefited from the increased practice of M&M activities, then conversely the decrease of music and rhythmical movement interactions of the No M&M groups could have negatively impacted on these mothers’ developing relationship with their infants.

6.1.2 Play and Touch Interactions

The Play Interactions factor included the variables of mothers relaxing (without using music), talking and playing with their infants. Results showed there was no effect of M&M or F2F contact on their Play Interactions. Examining both the pre- and post-test results of the three variables, the mothers in general were very interactive with their infants but more so with talking and playing than relaxing (without music). The only group that increased their Play Interactions results over the 5 weeks was the M&M-Only group which was due to the increase in the variables of mothers’ playing and talking with their infants. It is possible the written guide of the self-instruction method for this M&M group could have been more effective than the M&M-F2F method. This was not predicted as it was thought the F2F method would be more effective due to the influence of the F2F mentoring of
the researcher. Similarly the Play and Chat (P&C) program group’s results (F2F-Only) were not reflective the F2F contact with the researcher or the program’s content which emphasised taking time to relax, talk and play with their infants, as a decrease occurred in each of the three variables for this group. The F2F-Only group’s enthusiasm for interacting with their infants during the weekly group sessions appears not to have transferred into the caregiving routines within the home. This group was more socially active with their infants outside the home than the other groups (as will be discussed in section 6.1.3) which could have affected the time they spent interacting with their infants within the home environment. Furthermore, there was anecdotal evidence from this group of mothers that children’s television programs were used as entertainment for their infants. It is possible that mothers thought their infants’ focus on the television indicated this to be more fulfilling than having playful interactions with them.

Mothers’ use of sensitive touch with their infants is thought to convey a soothing emotional effect on infants (Field, 2002), and mothers’ playful use of touch stimulates infants’ happiness (Mechthild Papoušek, 1996). Importantly, playful and sensitive touch interactions are part of the communicative gestural system that mothers use when communicating with their infants (as discussed previously in sections 3.3 and 3.3.1). The Touch Interaction factor encompassed both these types of touch, as it included the variables of mothers’ use of touch (as described in the qualitative MIMI data as sensitive patting and stroking, and playful tickling and hand/feet tapping of the infant) and massage with their infants. It was proposed (see section 3.3.1) that if the mothers were to increase their communicative use of music with their infants, it was likely their touch interactions would also increase. However, the Touch Interactions factorial results showed there was no significant effect of M&M. All groups increased their use of touch interactions over the 5-week period. The M&M-Only group’s increase was however significant as an effect of the absence of F2F contact. Again, this influence of the lack of F2F instruction was not predicted indicating that this method of instruction was more influential on the communicative interactions with their infants than the mothers who received the F2F instructions.
The descriptive results of the MIMI questionnaire indicated both the M&M groups increased playful touch while engaging their infants in tickly games associated with songs and rhymes. These data were supported by that of the M&M Program Evaluation results showing that music activities that incorporated rhythmical tickly games were regarded by both groups as a beneficial activity for mutually enjoyable dyadic interactions. From such results not only does it appear that mothers’ playful use of touch stimulated infants’ happy mood, as Mechthild Papoušek (1996) noted, it may have reciprocal benefits by stimulating a positive mood in both infants and mothers. Interestingly, the qualitative results of the MIMI at pretest showed none of the groups used touch to play tickly games with their infants and remained unchanged for both the No M&M groups over the 5-week period. These touch interaction results could be indicative that first-time mothers may not be practicing music activities associated with playful touch because they have no knowledge of such a repertoire.

The Play and Chat program did not implement any activity that integrated music with mothers’ use of touch interactions. Instead, the program introduced the mothers to the use of touch with their infants during play interactions such as hand and feet clapping/tapping and infant massage. Results of the massage and touch factor variables showed mothers use of touch to be relatively unchanged although the qualitative data of the MIMI questionnaire showed an increase with playful clapping/tapping activities, and their use of massage for relaxation increased slightly. The Control group’s increase of the touch interaction factor results appears to have occurred from their increased use of massage, as indicated by results of the massage factor variable and the qualitative data of the MIMI questionnaire. Infant massage is a topic discussed in the early parenting classes at some maternal and infant health clinics and it is likely that many of the mothers from all four groups had been given instruction on the use of massage either before participating in Study 1 or during the five weeks of their participation (as many were still attending these classes while participating in the study). Although this instruction could have equally influenced mothers in all four groups, it could have been more influencing on the Control group if these mothers had limited knowledge of enjoyable activities to share with their infants. These mothers could have been more likely to practice massage because they
lacked resources or influences that educated them about other types of touch interactions with their infants.

The *Touch Interaction* results are a further indication that unless educated otherwise about integrating music with the use of sensitive and playful touch, first-time mothers and their infants may not be experiencing the pleasure that can be gained from such interactions. Infants’ need for playful companionship was discussed in section 2.1.2. It was noted that from 3 months of age, infants’ intrinsic motivation for social interaction and playfulness stimulates their desire to partner the mother’s use of playful, rhythmical games such as hand-clapping and tickly rhymes (Trevarthen, 1993, 2001). Trainor et al. (1997) noted that playful music activities motivate mothers to interact with their infants. To satisfy such needs and to consolidate dyadic companionship, it appears that a repertoire of playful music and movement activities can stimulate pleasure and inspire mothers to enrich their communicative interactions with their infants.

### 6.1.3 Social Interactions

The *Social Interaction* factor did not represent mothers’ face-to-face social interactions with their infant in the home. Instead it represented the social activities of the mothers with their infant outside the home, as the two factor variables included mothers taking the infant on outings and going shopping. Results showed there was no significant effect of M&M or F2F contact. It was predicted that F2F social contact of the researcher may have influenced mothers’ networking with the other mothers in the groups. Over the 5-week period, all groups showed an increase in their social activities with their infants. However, it was the F2F-Only group that showed the greatest increase in the variable of socialising with their infants outside the home. This result could have been due to an influence of F2F instruction but also the P&C program was devised to build on mothers’ social network with other first-time mothers. During the weekly sessions mothers would organise additional outings during their week such as going to the movies with their infants. While taking this possible influence on the F2F-Only group into account, the overall results of the groups could also have been affected by factors such as mothers’ adjustment to the parenting role, infant age and social support. It was discussed in section 1.2 that the early postpartum months are generally exhausting for new mothers because of the
constant demands of the caregiving tasks and the need for physical recovery after giving birth (Brown, Lumley, 2000; Thompson et al., 2002). With infants’ mean age in this study being 3.3 months at the time of pretest, most mothers would have physically recovered from giving birth and were now adjusting to their caregiving role. With the additional time over the 5-week period of participation in the study, mothers’ confidence in taking the infant out of the home environment may have increased. The infants’ development over the 5-week period could have also given the mothers increased flexibility to spend time away from the home and the daily caregiving tasks that consumed their day in the early months of parenting. In addition to these factors, most mothers reported having social support networks which included the meeting of other first-time mothers through their participation in early parenting classes at the maternal and infant health clinics from which they were recruited. It was common for these mothers to take their infants on outings to shopping centres and meet for coffee to break the social isolation associated with parenting and discuss parenting issues.

From this discussion so far, it has been shown that providing the mothers with a repertoire of various types of M&M activities, the frequency of music and rhythmical movement interactions with their infants increased together with mother-infant playfulness. It has also been shown that without the M&M program of activities, mothers’ use of music and rhythmical movement interactions as a means of sharing enjoyable time with their infants decreased. The results support previous research findings (Vlismas & Bowes, 1999) showing first-time educated, middle-class mothers appear to have a limited repertoire of music and rhythmical movement activities they practice with their infants unless educated otherwise.

6.2 Maternal Well-Being

In chapters 1 and 2, infant temperament and social support were identified as factors that can affect the quality of mothers’ interactions with their infants and maternal well-being. In particular these factors can impinge on the mother’s competence and sensitivity in her role as primary caregiver, affecting mood, parental stress and the developing relationship with her infant. Within the early postpartum period, mothers who receive high levels of social support from partners/ husbands and have a large
A network of family and friends from which they seek support are less likely to suffer from depression (Cutrona & Troutman, 1986), have lower stress associated with their parenting role and are more likely to be sensitive toward their infants during interaction than mothers with less support (Goldstein et al., 1996). In addition to the amount of social support that can affect mothers in their caregiving role, the type of support is also influential. Warren’s (2005) study (see section 1.3.1.2) showed that husbands’/partners’ support was instrumental to mothers early in their caregiving role as it provided physical assistance with the infant and emotional reassurance. This support, together with informational support that can be provided by healthcare nurses, is significantly related to mothers’ confidence in their caregiving tasks.

Overall, the mothers of Study 1 reported they were receiving sufficient and valued emotional support from their husbands/partners and families and had some degree of social support from friends. These mothers also reported they sought the informational support of the maternal health nurses from the clinics from which they were recruited for this study. Regarding infant temperament, mothers reported that in general, the infants were not displaying undue difficult behaviours. With the exception of certain routine times such as settling for a sleep and fussiness during feeding, mothers perceived their infants’ temperament as normal. It is therefore likely that the high level of social support which the mothers were receiving and the infants’ non-distressed temperament positively influenced the well-being of the mothers in their parenting role.

As this was a sample of healthy mothers with no specific problems associated with early parenting it was predicted that independent of M&M and F2F contact measures of maternal well-being would show improvement for all four groups as a factor of time over the 5-week period. Over and above these predictions however, it was thought that M&M and F2F contact would further influence maternal well-being. These predictions were only partially supported as will be discussed in the following sections of 6.2.1 and 6.2.2.
6.2.1 Maternal Mood, Stress and Attitudes toward Parenting

Results of the EPDS (Cox et al., 1987) showed the data represented a normative sample of post-natal mothers as all the mothers were in the low risk category for post-natal depression and it was therefore unlikely that M&M and F2F contact would have influenced these results. As the results showed the EPDS mean scores for each group decreased during the five week period only as an effect of time as there was no effect of the M&M or F2F contact factors.

The results of the PSI/SF (Abidin, 1995) indicated the mothers were in a low risk category of parental stress relating to the dyadic relationship and parental perception of the infants’ behaviour. Abidin (1995) noted a Total Stress score of 90 and above indicates parents are experiencing clinically significant levels of stress associated with the child’s behavioural characteristics and parental difficulty in interacting with the child (Abidin, 1995). The pretest mean scores indicated all groups of mothers were not experiencing significant levels of stress, and similar to the results of the EPDS, scores decreased significantly during the 5-week period with no effect of the M&M or F2F contact factors. The scores of the PSI/SF also indicated dyadic interactions were not perceived by the mothers as being difficult or dysfunctional and that the infants were not perceived as having difficult temperaments (supporting the results of mothers’ reported perception of their infants’ temperament in the General Information Questionnaire).

It is possible the results of the EPDS and the PSI/SF reflected mothers’ satisfaction with the social support they were receiving. For reasons discussed in section 6.2 mothers’ social support possibly had a positive impact on their mood and degree of stress associated with their early parenting. The infants’ temperament, whether it was positively affected by mothers’ satisfaction with the social support, or if as a sample they were representative of not having difficult temperaments to care for as the mothers perceived, could also have affected the results of the EPDS and PSI/SF.

The MAQ (Warner et al., 1997) measured cognitions that related to role change, expectations of motherhood and expectations of the self as a mother. The results showed that in general, the sample of mothers had adapted to their parenting role and had realistic expectations of the self in this role. Similar to the results of the EPDS
and the PSI/SI, mean scores decreased during the 5-week period. So, it is likely that the results of the MAQ were also positively influenced by mothers’ social support and infants’ temperament. It has been found that MAQ scores highly correlate with those of the EPDS (Hart & McMahan, 2006; Warner et al., 1997). As the mothers were not suffering from post-natal depression, and with the groups’ range of MAQ scores indicating the mothers were not at risk of maladaptive cognitions concerning motherhood, results showed the positive correlation of the MAQ and EPDS.

Results of the EPDS, PSI/SF and MAQ showed M&M and F2F contact had no effect on this sample of mothers’ scores for each scale. As discussed, it is likely the social support the mothers were receiving and the infants’ temperaments being perceived by as not difficult positively affected the mothers’ mood state, stress and maternal attitude.

### 6.2.2 Maternal Post-Natal Attachment

The Maternal Post-Natal Attachment Scale (Condon & Corkindale, 1998) measured perceived mother-to-infant attachment, assessing the emotional bond and affection experienced by the mother towards her infant. It was expected that as a sample, the mothers’ perceived attachment to their infants would be within a normal range. It was predicted that as the dyadic relationship developed over the 5-week period, maternal attachment would increase for all groups as an effect of Time. Although the four groups of mothers were within normal range, results did not support this prediction. It was further predicated that above and beyond the increase as an effect of Time, the presence of M&M and F2F would further increase mothers’ perceived attachment results. Results showed only the M&M factor had an effect on mothers’ perceived attachment to their infants. The following discusses the specific results of the scale.

Results of the *Total Attachment* and the three separate domains of the scale - *Quality of Attachment, Pleasure of Interactions* and *Absence of Hostility* - indicated all groups were in the high category of attachment to their infants, both at pre- and post-test. However, the *Total Attachment* results show that the M&M factor significantly increased mothers’ perceived attachment to their infants, with no effect of the F2F
contact factor. As discussed in section 6.2, the participants as a total sample reported having sufficient social support which may have accounted for the F2F contact not having an influence on their perceived attachment to their infants. What was not predicted however was the No M&M groups’ decrease of perceived maternal attachment to their infants over the 5-week period. Based on the notion that the infants’ development over the 5 weeks could increase their responsiveness to mothers’ interactions (such as their increasing ability to smile, laugh, gaze at mother and vocalise) which in turn could further motivate the mothers to engage in pleasurable interactions, it was predicted that perceived maternal attachment would increase for all groups.

The *Quality of Attachment* domain measured mothers’ emotions for their infants and competence in the role as mother. Condon and Corkindale (1998) noted that although this domain measures the parental aspect of the dyadic relationship, results reflect the interrelationship and reciprocity which exist between the mother and infant. In order for mothers to gain pleasure and feelings of competence from their interactions, infants’ responsiveness to the mothers’ actions are required. The results showed M&M significantly increased mothers’ *quality of attachment*. However the Control group showed a minimal increase and the F2F-Only group showed a significant decrease in this domain. The *Pleasure of Interactions* domain measures mothers’ desire for interaction and pleasure of proximity to their infant. Similar to the *Quality of Attachment* results, there was a significant effect of M&M. It has been proposed (see section 4.1) that mothers’ singing and gestural interactions with their infants fosters dyadic pleasure (Trehub & Trainor, 1998) and that a musical environment created by the mother and shared with her infant provides the foundation for a positive mother-infant relationship (Hodges, 1996). These results therefore suggest that the mothers’ increased frequency of using music and rhythmical movement activities with their infants could have impacted on the mothers’ desire for interaction and the gaining of mutual pleasure for both mother and infant. This notion is further supported by the M&M Program Evaluation results of both groups showing perceived participation benefits to be associated with enhancing the mother-infant relationship.
The Absence of Hostility domain measured mothers’ tolerance of their infant and responsibilities of infant care, and included items related to mothers’ feelings of being burdened by their role of caregiver. Results showed a significant improvement for the M&M groups and a deterioration occurring for the No M&M groups. Research has shown that mothers’ feelings of being burdened can be related to the amount of time they spend with their young infants on routines associated with their physical care such as feeding and changing, and infants’ difficult behaviour as reported by mothers appears to be more frequent during these times than other activities they may share (Hane, Fox, Polak-Toske, Ghera & Guner, 2006). It was proposed in section 4.4 that mothers singing to their infants during care routines could lessen the burden associated with these tasks (Trehub & Trainor, 1998) as singing releases emotions that promote positive feelings of well-being for both mother and infant (Trehub & Schellenberg 1995). Evidence from Study 1 suggests that it is not only mothers’ singing or interactions using specific M&M activities with their infants that positively affect their perceived emotional bond with their infant, but it is their enjoyment of sharing music and movement interactions that is important.

The discussion has suggested mothers’ increased use and enjoyment of the music and rhythmical movement activities positively influenced their perceived emotional attachment to their infants. Surprisingly, the F2F-Only group’s mean scores decreased significantly compared to the Control group, which indicates the information they received on the importance of play with their infants and the modelling of interactions with the F2F contact, did not have a positive impact on maternal attachment results. The F2F-Only group’s frequency of music and enjoyment of interaction with their infants also showed a significant decrease.

From the results of the Maternal Postnatal Attachment scale, it appears mothers’ practice of the M&M activities positively affected mothers’ perception of emotions for, and attachment to their infant. Without the encouraged use of M&M, mothers’ perceived attachment to their infants was in a state of decline.
6.2.3 Relaxation and Well-Being

While the mothers were in the low risk category for post-natal depression, parenting stress, and were adapting to their role as primary caregiver, results indicated M&M could have been beneficial to both the mothers’ and infants’ well-being in other ways. Results of *Music and Enjoyment of Interactions* factor variables and qualitative results of the MIMI questionnaire showed the M&M groups’ use of music for relaxation with their infants increased and that of the No M&M groups either decreased or showed little change over the 5 weeks. In addition to these results, and although more so for the M&M-Only group than the M&M-F2F group, the M&M Program Evaluation reports showed that 50% of the M&M-Only mothers and 17% of the M&M-F2F group claimed their practice of the M&M activities that included relaxation to music lifted their mood.

Repeated exposure to enjoyable music has been shown to benefit adult listeners by inducing feelings of being relaxed (Pelletier, 2004; Smith & Joyce, 2004). However, adults’ descriptions of being in a relaxed state differ according to Smith and Joyce (2004). They found the most likely descriptions adults used after being exposed to music for relaxation were feelings of being revived, peacefulness and joy. Furthermore, Sloboda (1991) found that repeated exposure to enjoyable music can evoke intense emotional responses in adults that boost motivation and self-image (as discussed in section 4.4). Although not measured by the questionnaires of Study 1, it could be that the M&M mothers using music for relaxation as part of enriching their caregiving day may have felt motivated and more positive than the mothers not using music for relaxation with their infants. Some indication of this effect was reported in the M&M Program Evaluation by 42% of M&M-F2F and 25% of M&M-Only mothers, who reported they developed confidence in interacting with their infants using M&M activities.

The M&M mothers’ reported increased use of music for relaxation and enjoyment with their infants could also have increased their infants’ pleasure during music listening. Research has found that infants have a listening preference for consonant music, and display contented behaviour during the listening experiences (Trainor & Heinmiller, 1998; Zentner & Kagan, 1998). Contrary to this are the No M&M groups’ results. Mothers’ reported decrease in enjoyment of using music for
relaxation could have lessened the incidence of their infants experiencing the sound of music they found pleasurable.

6.3 The Music and Movement Program Evaluation

6.3.1 M&M Groups’ Similarities

Based on the literature presented regarding the effects of social support on parenting infants, it was predicted that the M&M-F2F social contact implementation method would have a greater effect on mothers’ perceptions of the benefits gained from the program than the M&M self-instruction method. However, the M&M Program Evaluations for the two implementation methods (the face-to-face and the self-instruction method) showed no statistical significant differences between the two groups’ results for the three factors (i) Increase of M&M Repertoire & Enjoyment (associated with mothers’ increased repertoire of M&M activities and the increased enjoyment of sharing time with their infants), (ii) Mother-Infant Benefits (mothers perceptions of what they had gained as a parent and the impact the participation had on the relationship with their infants) and, (iii) Program Content (mothers rating the usefulness of the program’s content). In addition to these factorial results, mothers’ ratings of the overall content of the program and satisfaction with the quantity of activities provided were equivalent for both groups. There was however 8% of both groups indicating they would have preferred further instruction/program content.

Mothers of both groups reported that while the audio-tape of the program’s music content was used more in the initial stage of their participation it was not relied upon daily for entertainment and accompaniment to practise music and movement activities with their infants. Instead, mothers reported they interacted spontaneously with their infants, and as reported by 42% of M&M-F2F group and 25% of M&M-Only group the program assisted in providing creative ideas of using M&M activities with their infants. The spontaneity and creativity could have been associated not only with the mothers becoming familiar with the activities but also with their increased enjoyment of practising the music and movement activities during the caregiving day. Hanuš Papoušek (1996) argues that mothers’ combining the rhythm of bodily movements and vocal timbre of singing enhances their spontaneity and creativity when engaging with their infants. So the combining of the rhythmical activities with songs and rhymes could have inspired mothers’ creative interactions.
As discussed in section 6.2.3 as part of interpreting results of the Maternal Postnatal Attachment Scale, the M&M groups’ qualitative data reported the relationship with their infants had benefited from program participation. Mothers claimed the use of activities enhanced bonding with their infants and mother-infant happiness which was reciprocated during interactions. As predicted mothers of both M&M groups predominantly reported that playful music and movement activities were preferred over other activities for interacting with their infants. According to Trainor et al., (1997) playful music activities stimulate mothers’ interactions with their infants. Furthermore, Trevarthen (1993, 2001) notes that from 3 months of age infants’ intrinsic motivation for social interaction and playfulness stimulate their desire to partner the mother in games associated with nonsense rhymes, playsongs that involve knee jogging, hand-clapping, tickling and peekaboo. Together, these findings of Trevarthen (1993, 2001) and Trainor et al., (1997) present a framework that suggests mothers’ use of playful activities with their infants enhances pleasurable interactions and reciprocity of mother and infant. It is probable therefore, that mothers’ playful M&M interactions compared to other program activities influenced mothers’ increased emotional bond to their infants.

Comparing the face-to-face and self-instruction implementation methods of the M&M program, factorial results of the M&M Program Evaluation showed no significant difference between the groups for Increase of M&M Repertoire & Enjoyment, Mother-Infant Benefits and Program Content. Both groups reported playful M&M activities were predominantly practiced over other activities in the program. Similarly, both groups indicated benefits to the mother-infant relationship as an outcome of program participation.

6.3.2 M&M Groups’ Differences

Unlike the statistical results, the qualitative results showed that differences occurred between the groups as indicated by the M&M Program Evaluation results. Fifty percent of mothers in the M&M-Only group, compared to 8% of the M&M-F2F mothers reported one of the benefits of participation was learning about infant development using music activities. This result could reflect the M&M-Only group’s significant increase in all five interaction factors – Music and Enjoyment, Movement,
Play, Touch and Social Interactions – compared to the M&M-F2F group which increased significantly only in Music and Enjoyment, and Movement Interactions. The difference could have been influenced by two factors associated with methods of implementation, (i) the M&M-Only group received written guidance on the benefits of using M&M activities and, (ii) they received weekly individualised encouragement from the researcher. It was proposed in section 4.5.1 that the repetition of mothers’ musical actions builds on infants’ sense of predictability and security within their environment (Papoušek & Papoušek, 1987). The written material that was given to the M&M-Only mothers as part of their self-instruction package could have reinforced these benefits of using music and movement activities on a daily basis with their infants and ensuring time was set aside for play. During the weekly phone conversations the researcher praised the M&M-Only mothers for their efforts in integrating the music and movement activities into daily routines and for their spontaneous use of the activities. Although the same information together with encouragement and praise was given to the M&M-F2F group during the weekly sessions, the written and individual guidance of the M&M-Only mothers may have been more effective than the method used for the M&M-F2F group.

Although these differences in practice of M&M activities occurred between the groups, the face-to-face social contact of the M&M-F2F group also proved some benefit to these mothers, as shown by the M&M Program Evaluation qualitative results. It was predicted that the F2F method of implementation compared to the self-instruction method would be of benefit to the mothers in forming a social network. Fifty four percent of the F2F group indicated they benefited from meeting other first-time mothers and 50% indicated that socialising their babies with others (both with other mothers and babies) was beneficial.

6.3.3 Summary of the M&M Implementation Methods
The results from the two different methods of implementing the M&M program showed both similarities and differences. Regarding the content of the program, mothers’ reported repertoire of activities and benefits to the mother-infant relationship results showed both groups were equivalent. As predicated both groups reported they preferred to practice playful M&M activities over other activities provided in the program. Differences in the groups’ results indicated the M&M-Only
method was more effective in increasing mothers’ communicative interactions with their infants compared to the M&M-F2F method which was not predicted. The discussion about these results suggested the written instructions and the individualised support mothers were given by the researcher could have affected these results. As predicted, the mothers of the M&M-F2F group reported they benefited from socialising with the other mothers and infants.

6.4 Music and Movement as a Program for First-Time Mothers

Criticism of developing music programs for parents of young infants was expressed by Trehub (2002) as it was argued that such programs could not promote the emotional richness of spontaneous performances by the parents (as previously discussed in section 4.5.2). However, from the results of Study 1 it has been shown that providing first-time mothers with a repertoire of enjoyable music and rhythmical movement activities to share with their infants is likely to inspire mothers to be spontaneous with their music and movement interactions with their infants throughout the day. Without this influence, the first-time mothers of Study 1 appeared to have a limited repertoire of enjoyable communicative activities to share with their infants. Furthermore, as these infants developed over the 5 weeks the mothers did not extend their repertoire, and indeed reported a decrease in their communicative interactions with their infants.

Trehub (2002) also argues that mothers’ musical interactions with their infants are intuitive. The theory of intuitive parenting (as discussed in sections 2.1.2.1 and 2.2.2) presents the notion that mothers’ positive communicative interactions with their infants are intrinsically motivated or innate (Papoušek & Papoušek, 1995, 1987). If the mother’s intuitiveness is not inhibited by stress factors, the mother-infant relationship develops from the positive dyadic communicative interactions (Papoušek & von Hofacker, 1995). Results showed the sample of first-time mothers were not experiencing stress associated with their parenting role and, at pre-test, the frequency that mothers were engaging their infants showed they actively used some music and movement activities. However, what cannot be concluded is if these interactions were intuitive. Custodero and Johnson-Green (2003) found that parents’ musical training was positively correlated to providing their infants of 4-6 months of
age with musical experiences within the home environment (as discussed in section 4.2). Although Study 1 did not investigate the musical background of the mothers it was shown that in general the mothers of all four groups enjoyed music as part of their everyday lives.

As an intervention devised to enhance healthy first-time mothers’ communicative music and rhythmical movement interactions with their infants, it was the up-tempo playful activities that were predominantly practiced. However, there was also evidence of mothers’ increased use of music for relaxation. Without the intervention of the program, mothers’ perceived the frequency of their enjoyable music and movement interactions to decrease over the 5-week period. This latter result could also have been an affect of changes due to infant development over this period. The age range of the infants at post-test was 3.5 to 6.6 months old. From 4 months of age infants are increasingly interested in their environment (as discussed in section 2.1.2). As a result, they focus less on mothers’ face-to-face interactions, this being dependent on the mother’s communicative ability to engage her infant and the subsequent infant’s interest in the mother’s actions (Bornstein, Maital & Tall, 1997). It may be that as an effect of the infants’ development, together with mothers’ repertoires of M&M activities remaining limited over the five weeks, the F2F-Only and Control mothers’ motivation to further develop interaction skills that could attract and sustain the infants’ attention decreased. As a result, the mutuality of the mother and infant sharing enjoyable time using music and rhythmical movement decreased.

Research evidence has been presented that suggests mothers’ use of music and movement activities with their young infants could promote dyadic well-being and reciprocity (Hatch & Maietta, 1991; Hodges, 1996; M. Papoušek, 1996; Trehub & Trainor, 1998). However, what is unclear is whether the use of M&M activities truly affects the reciprocity of the mother and infant relationship. The results of this study can only report mothers’ perception that their use of M&M with their infants enhances interactions and dyadic reciprocity.
6.5 Implications for Further Research

Study 1 was designed to obtain self-report data. So the results can only be regarded as representing well educated middle-class first-time mothers’ perceptions of their own well-being and of the perceived frequency of interactions they had with their infants during the five weeks of participating in the study. Furthermore, demand characteristics associated with the M&M mothers’ responses to questionnaires about their use of music and movement and the evaluation of the program could have affected the validity of the results. To overcome these possible confounds further research that can provide more objective evidence of how the practice of music and rhythmical movement affects first-time mothers and their infants under the age of six months is required.

Study 2 will investigate the effects of M&M on (i) the changes in the quality of mothers’ Infant-Directed Speech, and (ii) mother-infant behavioural interactions.
CHAPTER 7

Measures of Treatment Efficacy:
Self-Ratings of Behaviour and Objective Measurements of Behaviour
7.1 The Story So Far

Study 1 showed improvements occurred in mothers’ self-rated results as an effect of M&M. Study 2 was devised to measure and analyse behavioural outcomes within the mother-infant relationship in response to the communicative effects of music and movement (M&M). This chapter, as a prelude to Study 2, begins with a summary of the results of Study 1. It proceeds to consider the nature of other behavioural dependent variables that could be employed to assess the effect of M&M on the mother-infant interactions. Measurements to assess behaviour as indices of improvement with the mothers and infants will be discussed. This is followed by a review of literature regarding such variables as a lead-in to the nature of the measurements to be used in Study 2.

7.1.1 Summary of Study 1 Results

In Study 1 the M&M and F2F components of Music and Movement were manipulated independently, and their effects on various maternal-rated scales were measured before and after the treatment conditions. In general, it was found that the M&M factor had significant effects on a number of variables, whereas the F2F factor did not.

Thus, in groups who received the M&M program, either with or without F2F contact, compared with mothers who had F2F contact only or no treatment, mothers’ self-rated interactions with their infants and their maternal attachment generally increased over time. Moreover, in the particular case of musical interactions and enjoyment (mothers’ enjoyment of music, enjoyment of music with their infants, singing to their infants, and relaxing to music with their infants), M&M mothers’ ratings increased over time while in the non-M&M groups these ratings decreased or remained the same. Similar results were found for mothers’ self-rated attachment – for M&M mothers this increased over time, while for the non-M&M groups these scores decreased.

In addition, considering the two types of M&M implementation (with or without F2F contact), there was even some evidence (see Table 5.4) that the self-instruction M&M-Only group showed greater increases in the frequency of their interactions.
with their infants than the M&M-F2F group. These results suggest that self-
instruction implementation of the program, M&M-Only, being self-paced with
written instruction material, could have been more motivating for the mothers than
the M&M-F2F instruction method.

Finally, when mothers in the two M&M groups were questioned, both groups gave
similar evaluations of the program, indicating increased enjoyment and repertoire of
M&M activities, and increased use of up-tempo playful activities.

7.1.2. Measurements of Behaviour
Self-ratings of behaviour employed in Study 1 indicated mothers’ more positive
orientation to their interactions with their infants as a product of M&M (compared to
the No M&M mothers), and these interactions possibly have specific behavioural
outcomes. However, Study 1 was not designed to measure such objective
behavioural outcomes. There are at least three possible types of outcomes that could
be measured: (i) effects on the mothers’ behaviour per se, (ii) effects on the infants’
behaviour per se, and (iii) effects on the behavioural interactions between mother and
infant. Of these the second is of least interest here, as the M&M program is thought
to improve just those mother and infant behaviours that result in better interactions.
Moreover, any effects of the program per se, or of improved interactions caused by
the program on infant behaviour alone would best be measured at a later stage in a
follow-up, perhaps one or more years later so that mature linguistic, social and
cognitive skills could be measured.

Here, the concentration is on the first and third measures of behaviour, but the
question remains, which particular measures of behaviour will be used. These are
discussed in the next section.

7.2 Behavioural Measures of Treatment Efficacy in Infancy

For reasons that will become apparent in Study 2, mothers’ Infant-Directed Speech
(IDS) will be used as a measure of mothers’ behaviour, and ratings of mother and
infant dyadic interactions as a measure of behavioural interaction. Relevant literature
on each of these is presented below. The specific data collection methods and measures are detailed in sections 8.5.3 and 8.5.4.

7.2.1 Infant-Directed Speech and Measures of Attention, Affect, and Linguistic Functions

The attentional, social/affective and linguistic functions of maternal IDS were discussed in section 3.2.2. Associated with these communicative functions of mothers’ speech when interacting with their infants are the unique characteristics of IDS (discussed in section 3.2.1). As research has found (Andruski et al., 1999; Fernald, 1992; Fernald & Kuhl, 1987; Grieser & Kuhl, 1988; Kuhl et al., 1997; Liu et al., 2003), and as already discussed in section 3.2.1, compared to ADS, IDS has:

- higher pitch which is thought to initially attract the infants’ attention
- expanded pitch range, slower tempo and duration of the speech which sustains infants’ attention
- increased contours of rising and falling pitch which conveys affection
- exaggerated articulation referred to as hyperarticulation which presents as a didactic function of the speech

Using combinations of these characteristics as measures of change in mothers’ IDS, Study 2 investigated the effects of M&M on maternal IDS.

7.2.1.1 Attentional Measures

Sensitive mothers’ IDS attracts and sustains their infants’ attention through the production of specific acoustic characteristics – higher pitch, greater pitch range and slower tempo compared to Adult-Directed Speech (Stern, Spieker, Barnett & MacKain, 1983; Fernald, 1992; Fernald & Kuhl 1987). As discussed in section 3.2.1.1, research has shown that the vowels /i/, /u/ and /a/ serve as useful measures in both IDS and ADS because they are acoustically extreme from each other (Andruski et al., 1999; Ladefoged, 2001). To investigate the effects of M&M on the attentional characteristics of the mothers’ IDS, the so called point ‘vowels’ /i/, /u/ and /a/ were extracted from the words *sheep*, *shoe* and *shark* using PRAAT (Boersma & Weenink, 2004). Mothers’ speech was recorded during play interactions with their infants using 3 toys - a sheep, a shoe, and a shark. As a comparison to their IDS, mothers’ ADS describing the toys to the researcher were also recorded.
7.2.1.2 Affective Measures

The affection conveyed in mothers’ IDS is thought to assist in the creating and maintaining of the emotional bond between mother and infant (Grieser & Kuhl, 1988; Trainor, Austin & Desjardins, 2000). As discussed in section 3.2.2.1 the affective prosodic patterns of maternal IDS are characterised by particular elements of intonation and rhythm. Measures of intonation were used to assess the effects of M&M on the affective characteristics of mothers’ IDS. This was determined by measuring pitch, pitch range and duration (using the PRAAT program) of the last phrase in a rhyme (composed by the researcher) that mothers recited to their infants during play interactions.

*Two little hands go clap, clap, clap,*
*Two little feet go tap, tap, tap,*
*And these little toes can touch Mummy’s nose.*

The words of this rhyme were composed to stimulate mothers’ use of gestures during the recitation. Trainor et al. (2000) suggested that IDS prosody is emotionally expressive and unconstrained because of the love that sensitive mothers’ naturally convey to their infants. In addition, Dissanayake (2000), Stern (1985) and Sullivan and Horowitz (1983) advocate that emotionally expressive speech is enhanced by mothers expressiveness of gestural communication and is exhibited through head and facial movements, hand gestures and touch (see section 3.3). So to create the situation where mothers would be encouraged to deliver affective speech to their infants, the final phrase, ‘*And these little toes can touch Mummy’s nose*’, which clearly encourages mothers to touch and interact with their infants, was used for analyses. Mothers’ ADS of this rhyme was not recorded because of the obvious inappropriateness of the mother reciting this to an adult.

As a complement to the acoustic measures, rated measures of affect associated with the communicative intentions of mothers IDS were also used in Study 2. Emotional and intentional characteristics of mothers’ speech when engaging with their infants were rated using the five scales of Communicative Intent (Burnham, Kitamura & Vollmer-Conna, 2002; Kitamura & Burnham, 2003) as discussed in 3.2.2.1. The scales are as follows.
Scale 1 *Positive or Negative Affect* rates the perceived positive or negative affect of mothers’ tone of voice.

Scale 2 *Intention to Express Affection* rates the degree of affection in mothers’ tone of voice.

Scale 3 *Intention to Encourage Attention* rates mothers’ vocal tone that engages and maintains infant attention.

Scale 4 *Intention to Comfort or Soothe* rates the comforting/soothing tone of voice, frequently associated in the literature with the degree of falling contours of the mothers’ speech.

Scale 5 *Intention to Direct Behavior* rates the mothers’ directive and prohibitive utterances.

Following the procedure of Kitamura and Burnham (2003), the speech samples were low pass filtered, using a Hann filter, at 400 Hz with 100 Hz smoothing using *Praat* Version 4.2.23. Low-pass filtering of speech recordings renders the utterances unintelligible, while leaving the intonation contours of the speech intact.

### 7.2.1.3 Linguistic Measures

To determine if M&M had an effect on the didactic function of maternal IDS, Study 2 compared the vowel articulation of mothers’ IDS to that of their ADS. As discussed in section 3.2.2.3, vowel articulation of mothers’ IDS compared to their ADS is characteristically exaggerated and is termed *hyperarticulation*. By plotting the F1 and F2 values of the vowels /i/, /u/ and /a/ (detailed in section 3.2.2.3), Liu et al. (2003) found the acoustic space of these vowels (represented as a triangle) produced in mothers’ IDS was not only larger than that of their ADS but maternal IDS correlated with infants’ speech discrimination. From these results, as well as those of Burnham et al. (2002), it was concluded that hyperarticulation is a didactic technique that affects infants’ early language learning.

Study 2 employed the technique of plotting the F1 and F2 values of /i/, /u/ and /a/ from the words *sheep, shoe* and *shark* to compare the articulation of the mothers’ IDS to their ADS. The F1 and F2 values of the vowels were calculated using PRAAT from the same sample of vowels used for the analyses of the attentional characteristics (see section 8.5.5.1).
7.2.2 Dyadic Reciprocity and the Mother-Infant/Toddler Play Scale

Literature has been presented suggesting that mothers’ use of music and movement activities with their infants promotes dyadic well-being and reciprocity as it is thought that a musical environment created by the mother produces a positive communicative mother-infant relationship (Hatch & Maietta, 1991; Hodges, 1996; M. Papoušek, 1996; Trehub & Trainor, 1998) (see chapter 4). However, research has not investigated if this is so – that mother’s use of music and movement activities actually affects behavioural exchanges of mother and infant resulting in an increase in dyadic reciprocity. Study 2 will provide such evidence using the Mother-Infant/Toddler Play scale (Chatoor, Getson & Himmelberg, 1985).

The scale was devised by Chatoor, Getson and Himmelberg, (1985) to assess dyadic interactions between mothers and their infants/toddlers diagnosed with anorexia nervosa. While the scale was assessed to be the best available for dyadic interaction in the context of Study 2, its use was potentially problematic. Only one study discussing the scale’s use in examining results of normative versus non-normative data has been published (Chatoor, Egan, Getson, Menvielle & O’Donnell, 1988). The reliability and validity of the scale has not been published. The researcher accessed the scale from a clinical psychologist and researcher47 who had used the scale in a study of clinically depressed mothers and their young infants to assess behavioural interactions. However, this study was not published. To seek further information regarding the scale before adapting its use to this study, the researcher contacted the first author of the scale, Dr Irene Chatoor, for further information, but further information was not available. Because of this lack of information regarding reliability and validity, two other scales were considered.

The Pediatric Infant Parent Exam (PIPE) designed by Fiese, Poehlmann, Irwin, Gordon and Curry-Bleggi (2001) was considered because of its focus on measuring reciprocity of mother and infant while playing an interaction game of peek-a-boo. However, because infant age in this present study was between 3 and 4 months at pre-test, it was thought that young infant responsiveness to such a game would not be
developmentally appropriate. This game also presented problems at post-test as it was included as part of the M&M program’s repertoire of musical games and the rating of such mother-infant play interactions may merely have been measuring demand characteristics.

The Emotional Availability scales (Biringen, 1999; Biringen, Robinson & Emde, 1993) were considered because of the focus on parent’s emotional availability and child responsiveness and involvement in dyadic interactions. The scale provides four parental (sensitivity, structuring, non-hostile, and non-intrusiveness) and two child (responsiveness, involvement) domains. Thus, the focus is on the emotional availability of both partners. However, these scales are mainly directed at the toddler and older aged child and substantial variation to the scales for this study would have been required. Training in the use of these scales was also required and was not available to the researcher.

The researcher proceeded with using the Mother-Infant/Toddler Play scale because of its general suitability and relevance to the study for measuring mothers and young infants’ engagement and behavioural exchanges. Studies of mother–infant interaction in the play situation suggest that an infant’s responsiveness and affective expressions are directly related to the mother’s responsive behavior, particularly in the first six months of life (Brazelton, Koslowski, & Main, 1974; Stern, 1977). As the infants in this study were as young as 3 months at the time of pre-test, they may have limited interactive repertoire with their mothers, and consequently mothers are more likely to structure and lead the play. The items of this scale are reflective of this, and appropriate for measuring young infant engagement and behavioural exchanges.

7.3 The Story Continued: Behavioural Measures of the Efficacy of a Music and Movement Program

Study 1 demonstrated that the M&M program positively affects mothers’ subjective ratings of their interactions with their infants, their maternal attitudes, and their self-rated attachment. It has also been discussed above that other more objective measures may be used to measure the effect of behavioural interventions such as Music and Movement. Acknowledging such evidence showing the effect that mothers’ communicative use of speech has on their developing relationship with
their infant, together with the literature proposing that M&M positively affects the reciprocity of mother and infants, the framework of Study 2 was formed. Mothers’ communicative use of speech was measured via their Infant-Directed Speech, including acoustic, communicative intent, and linguistic/didactic measures; and Mother-Infant reciprocity was measured via the Mother-Infant/Toddler Play scale.
CHAPTER 8

STUDY 2

The Effects of Music and Movement on Mothers’ Infant-Directed Speech and Mother-Infant Behavioural Interactions
8.1 Overview

The results of Study 1 indicated that the M&M program *per se* rather than any social facilitation via face-to-face (F2F) contact resulted in improvements in mothers’ self-rated interactions with their infants and maternal post-natal attachment. In Study 2 the effect of M&M on (a) mothers’ behaviour, and (b) on mother-infant behavioural interactions were measured in order to evaluate whether the self-rated improvements found in Study 1 are borne out in behavioural improvements. The F2F factor was not included in this study as there were no effects of this factor alone on self-ratings in Study 1. The question remains regarding what particular aspects of mothers’ behaviour and mother-infant behaviour are to be measured. As reviewed in Chapter 7, various measurements of Infant-Directed Speech, plus measurements of dyadic reciprocity are applicable to determine the effect of the M&M program.

8.2 Design and General Expectations

A 2 x (2) design was employed. Time was the independent within-subjects variable and M&M was investigated as the independent between-subjects variable with two groups being formed – the M&M group and the No Treatment Control group. For reasons discussed in section 5.1.2 regarding the design of Study 1, the No Treatment group was devised to control for the effects of M&M and infant development that may influence behaviours associated with the mother-infant relationship over the 5-week period. Design details of Study 2 are set out below as is an overview of the dependent variables.

8.2.1 Group Variables

In this study two new groups of mother-infant dyads were tested as follows:

1. An M&M treatment group in which the self-instruction method of the M&M program (as in the M&M-Only procedure in Study 1) was implemented over a 5-week period with pre- and post-test measures.
2. A No Program Control group that did not take part in any program (similar to the No Program No Contact (Control) group in Study 1) with pre- and post-test measures taken at the start and end of a 5-week period.48

8.2.2 Measurements
At the start and end of the 5-week period three types of dependent measures were taken - IDS, Interactions, and Self-Ratings, as set out below:

8.2.2.1 Infant-Directed Speech Measures
Three separate measures of Infant-Directed Speech (IDS) were taken both at pre-test and post-test, namely measures of:

(i) Attention, via acoustic measures of mean pitch, range and duration based on vowels /i/,/u/ and /a/
(ii) Affect, via:
   a. acoustic measures of mean pitch, range and duration on the intonation of a complete phrase and
   b. Communicative Intent rated by naïve listeners to the speech
(iii) Linguistic/Didactic effects measured by the relative size of vowel space in mothers’ speech

With the exception of Affect, these measures, the relative incidence of the specific variable in IDS was compared to that in ADS. For example, vowel space effects were measured by hyperarticulation – the area of vowel triangles in IDS divided by the area in ADS.

8.2.2.2 Dyadic Interaction Measures
Dyadic Reciprocity was measured using the Mother-Infant/Toddler Play scale (Chatoor, Getson & Himmelberg, 1985). This was administered both at pre-test and post-test, and includes a number of sub-scales namely:

(i) Maternal unresponsiveness to infant’s needs
(ii) Maternal intrusiveness
(iii) Dyadic conflict
(iv) Dyadic reciprocity

48 At the completion of the 5-week control period, these mothers were offered the M&M self instruction program in appreciation of their participation in the study.
8.2.2.3 Questionnaires and Self-Ratings

In order to provide some continuity between Study 1 and Study 2 and to ensure appropriate screening of mothers, in addition to the General Information Questionnaire, additional data via two of questionnaires used in Study 1 were administered at pre-test and again at post-test, namely the:

(i) Edinburgh Postnatal Depression Scale (EPDS)

(ii) Maternal Post-Natal Attachment Scale (MPNAS)

It was expected that certain characteristics associated with the attentional, affective and didactic functions of mothers’ IDs (compared to their ADS only for the attentional and didactic variables) would improve between pre- and post-test for the M&M but not the control group. It was also expected that there would be an increase in dyadic reciprocity in the M&M, but not the Control group between pre- and post-test. Finally, on the basis of the Study 1 results it was expected that there would be an increase between pre- and post-test in self-rated attachment in the M&M but not the Control group; and a general pre- to post-test decrease in postnatal depression equally for the two groups.

8.3 Participant Selection

As this study was concerned with measurement of particular qualities of mothers’ IDs and their behavioural exchanges with their infants, the age range of the infants was restricted to 3 to 4 months at commencement of the study. This was to minimise the potentially confounding effects that the lack of infants’ development (younger than 3 months) could have on their observed vocal and behavioural responsiveness to their mothers’ interactions. For example, research has shown (see section 3.2.1) that infants’ preference for maternal IDS could be an emergent feature of their early perceptual development. This preference may not be present at 1 month of age, but develop during the early postpartum months to be present by 4 months (Cooper et al., 1997). Infants older than 4 months show an increasing interest in their environment which has the potential to distract them during face-to-face interactions with their mother, depending on the mothers’ communicative ability to attract and sustain their infants’ attention (Bornstein et al., 1997). As a consequence infants of 3 to 4 months of age were recruited.
8.4 Specific Predictions

Predictions concerning the effects of M&M on the acoustic qualities of the mothers’ IDS and the behavioural interaction with their infants are as follows.

1. The attentional characteristics of mothers’ IDS, as measured by mean pitch, pitch range and duration of the vowels /i/, /u/ and /a/ (measured in the words sheep, shoe and shark) as a proportion of the same measures for ADS will show an increase as an effect of the M&M program. The Control group results will either show a decrease as an effect of not having M&M (based on the results of Study 1 indicating a general decrease in the No M&M mothers’ communicative interactions with their infants) or remain the same.

2. Intonation, an affective element of mothers’ IDS, will be measured by the pitch mean, pitch range and duration of a phrase extracted from a rhyme that mothers recite to their infants. Results should show an increase in these acoustic characteristics as an effect of the M&M program. The Control group results will either decrease (based on the results of Study 1 indicating that mothers without M&M decreased their emotional attachment to their infants) or remain the same.

3. Mothers’ Communicative Intent (Burnham et al., 2002; Kitamura & Burnham, 2003) will change as a consequence of M&M. Predictions of the results for the 5 scales use to gauge mothers’ Communicative Intent are as follows:

   (i) Positive or Negative Affect, Express Affection, Encourage Attention will increase for the M&M group and no change for the Control group. These predictions are based on the assumption that M&M will positively influence the affective and attentional acoustic characteristics of mothers’ IDS.

   (ii) Comfort or Soothe intention in mothers’ IDS was shown to abate when infants are 3 months old (Kitamura & Burnham, 2003). These results were however, positively correlated to the mean pitch of mothers’ IDS. Considering the age of the infants for Study 2 and without M&M as an intervention, it is predicted mothers’ Comfort or Soothe tone will decrease for
the Control group. However, if the M&M group’s mean pitch of their IDS increases as an effect of M&M, their results of Comfort or Soothe are likely to increase.

(iii) *Direct Behaviour* is perceived to be a directive and prohibitive tone in mothers’ speech. Kitamura & Burnham (2003) showed mothers’ Direct Behaviour tone increased with infants’ age and peaked at 9 months. Based on these results it is predicted the Control group will increase slightly on this scale. However, as an effect of M&M positively influencing mothers’ enjoyment of interacting with their infants it is unlikely that during these interaction mothers vocal tone of Direct Behaviour will increase. It is predicted the M&M group results will remain unchanged or decrease slightly.

4. Vowel triangle areas will be measured by plotting the F1 and F2 values of the vowels /i/, /u/ and /a/ for both IDS and ADS. Vowel hyperarticulation, the degree to which vowel space is extended in IDS compared to ADS will be measured by expressing IDS vowel triangle area as a proportion of ADS vowel triangle area. Results should show no change in either the M&M or the Control groups’ hyperarticulation from pre- to post-test, as this is a measure of *linguistic* input from the mother, rather than, as is the case with the other three speech-related variables set out above, a measure of *social/affective* input from the mother.

5. Dyadic Reciprocity will be measured using the Mother-Infant/Toddler Play scale (Chatoor, Getson & Himmelberg, 1985). Based on the literature presented suggesting that mothers’ use of music and movement with their infants positively enhances the dyadic relationship, it is predicted there will be an effect of M&M - mother-infant reciprocity will increase for the M&M group. Based on the results of Study 1 which showed mothers’ without M&M decreased their frequency of M&M interactions with their infants it is expected that a decrease will occur for the Control group.

6. Perceived mother-to-infant attachment will be measured by the Maternal Post-natal Attachment Scale (Condon & Corkindale, 1998). As a confirmatory measure of Study 1’s results for this scale, it is expected that M&M will significantly increase mothers’ perception of their emotional bond
to their infants. Thus results for the M&M group should increase and those of the Control group should decrease.

7. Results of the Edinburgh Postnatal Depression Scale (Cox et al., 1987) should show similar results to Study 1. Mothers will represent a sample within the low risk category for postnatal depression and results will show a decrease in both the M&M and Control groups’ mean scores over the 5-week period.

8.4.1 Implicit Assumptions
Three main assumptions were made for Study 1. With the exception of Assumption 2 (The subjective reports of mothers are reliable and translate into (a) actual behaviour and (b) effect on the infant and the infant-mother relationship) Assumptions 1 and 3 continue to apply to Study 2. These are:

1. (a) Mothers may not be interacting with their infants using music and movement, as a traditional caregiving practice (M. Papousek, 1996; Vlismas & Bowes, 1999).
1. (b) Modern mothers may need to be educated about the importance of engaging with their infants using music and movement activities (Vlismas & Bowes, 1999).
1. (c) If mothers do in fact practice music and movement activities as part of the caregiving routine the M&M program of instructions will further enhance mothers’ existing interactive behaviour with their infants.

3. The sustaining effects of M&M (increases/decreases) on mothers’ interactions with their infants are difficult to determine without a long-term follow-up study.

8.5 Method

8.5.1 Participants
Forty eight first-time mothers with infants between 3 and 4 months of age were recruited for Study 2. Four of these mother-infant pairs ceased participation during the 5-week period due to illness and unforeseen circumstances. Mean age of remaining sample of forty four mothers was 32.9 years (SD=4.1, Range = 28-42). Infants’ mean age was 3.2 months (SD=0.43, Range = 3-4). From this sample, infant-mother dyads formed two groups of 22. There were no significant differences

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49 No post-test data were collected. Pretest data were not included for analyses.
between ages for mothers or infants between the groups, and sex representation of infants was approximately equal in the groups. Mother and infant mean ages and infants’ sex in each of the two groups are shown in Table 8.1

Table 8.1  

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mothers’ Age (years)</th>
<th>Infants’ Age (months)</th>
<th>Sex of Infants: number of boys and girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;M (N=22)</td>
<td>32.3 (SD = 3.9)</td>
<td>3.2 (SD = 0.33)</td>
<td>Boys = 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Girls = 9</td>
</tr>
<tr>
<td>Control (N=22)</td>
<td>33.5 (SD = 4.3)</td>
<td>3.2 (SD = 0.52)</td>
<td>Boys = 11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Girls = 11</td>
</tr>
</tbody>
</table>

All 44 infants were born within 2 weeks either side of full-term (38 to 42 weeks) and mothers reported their infants to be healthy and achieving normal developmental milestones for their birth age.

The sample of mothers represented middle-class socio-economic status. Forty two of the mothers had attained tertiary education either at university or at TAFE and two had gained professional positions through work experience. With the exception of five mothers who were working part-time, all other mothers were on maternity leave from their employment. Of the 44 mothers, 40 were married and four were cohabiting with their partner. All mothers reported that the infants’ fathers were taking an active role in parenting and all mothers viewed their social network of family and friends to be supportive and of assistance in their parenting role. All mothers were of an English speaking background yet not all were Australian born. Two were English, two were Canadian and one was Irish. These mothers had been living in Australia for less than five years.

Similar to the sample of Study 1, mothers regarded themselves as being healthy, although 24 (54%) reported they had experienced problems with breastfeeding in the early weeks of parenting, which had caused them distress. As for Study 1, this was a normative study, and because of the effects that post-natal depression can have on mothers’ interactions with their infants (as discussed in section 1.3.2) mothers were screened for postnatal depression at the time of pretest using The Edinburgh Postnatal Depression Scale (EPDS - Cox, J.L., Holden, J.M. and Sagovsky, R.,
1987). Only one mother (who did not complete her participation) recorded a score indicating the possibility of post-natal depression.

### 8.5.2 Recruitment

Participants were recruited from the same three Maternal and Infant Health clinics of the Queensland Community Health Department as for Study 1. The information brochure presented to mothers was that used in Study 1 with the exception of a change to infants’ age needing to be 3 to 4 months old (see Appendix 8). As for Study 1, brochures that included the researcher’s telephone number and described the research were placed on the notice boards of the clinics. The researcher also met with groups of mothers who were participating in education classes for first-time parents at the clinics to discuss the research project. Mothers were told the focus of the research was on mother-infant interactions, exploring the types of activities that mothers share with their infants, and given a brochure. The researcher asked interested mothers to telephone and discuss their participation.

#### 8.5.2.1 Participants’ Involvement

Similar to the procedure of Study 1, at the time of phoning the researcher, mothers were randomly assigned to one of the two groups using numbers from a random numbers table, so that assignment was without bias. Mothers were asked at which clinic they received the brochure and whether they were participating in the education classes for first-time parents at that clinic. They were told the aim of the project was to investigate how mothers use activities such as relaxation, movement, music, games and toys during interactions with their infants. As for Study 1, mothers were told that if they were planning to be absent (e.g. a vacation) during the 5-week period, participation in the study was not appropriate. No mothers intended on being away during their participation and no mothers dropped out at the conclusion of the researcher’s description of their proposed participation in the study.

The potential M&M participants were told the same procedure as the M&M-Only participants (M&M-Self Instruction method) of Study 1. It was explained that over a 5 week period, and at their own pace, the mothers would use a self-instruction

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50 Study 2 was approved under the same protocol of the Human Research Ethics Committee of The University of Western Sydney as Study 1. It was also approved by Queensland Health of the Royal Children’s Hospital and District Health Services under the same protocol as Study 1.
program of activities with their infants that involved relaxation, movement, the use of songs and rhymes, and games suitable for young infants. The program was in the form of an audiotape and written material (see Appendix 3) that guided the mothers through the activities. Mothers were told that the researcher would telephone them weekly (for approximately 10-15 minutes) to discuss their progress, and if needed, participants could phone the researcher if they had questions that needed to be answered outside of the organised time for phone contact.

The potential Control participants were told that over a 5-week period the researcher was interested in the types of activities they shared with their infants. After their participation in the study, the mothers were told they would be offered a self instruction program that consisted of an audio-tape and written suggestions of activities that they could share with their infant (that is, the M&M-SI program).

All mothers were told that they would be required to answer questionnaires regarding their parenting role and that a play session of approximately 6 minutes of them interacting with their infant would be video and audio recorded. Mothers’ speech to the researcher would also be recorded without the infant being present for approximately 30 seconds. Data collection would be carried out in the participants’ homes by the researcher and an assistant at the start and conclusion (pre- and post-test) of their 5-week involvement. It was explained that signing a consent form to be a participant in the research project was required and that all video recorded material was strictly confidential and for the use of the research project only.

If mothers were still interested after the details of their involvement were explained, an appointment of about one hour was arranged for signing the participant consent form, completing the pre-test questionnaires and recording of the video and audio data. No mothers dropped out at the conclusion of the researcher’s description of their proposed participation in the study.

8.5.3 Data Collection Procedure
Pre- and post-test data of self-report questionnaires and video and voice recordings were collected in the homes of the participants. The naturalistic setting was chosen for the recordings as it has been shown that mothers are more at ease interacting with
their infants in their familiar home environment, when compared to a laboratory setting (Leaper, Anderson & Sanders, 1998). Through informal discussion, mothers’ preference for completing questionnaires in their homes was also found in Study 1.

At the start of data collection the researcher and her assistant began a general conversation with the mother, with the focus on the infant. The intention was to put the mother at ease and to raise a smile from the baby. It was considered very important in this study that the mother-infant dyad gain trust in the researcher and assistant so that video and audio recordings could be carried out in a relaxed environment. The researcher then discussed the data collection procedure with the mother. Mothers were given the opportunity to ask questions regarding their involvement before signing the participant consent form and answering questionnaires. The research assistant, who was trained and experienced in early childhood education, interacted with the infant to make it easier for the mother to complete the questionnaires.

While mothers answered the questionnaires, the researcher set up a JVC Compact VHS video recorder. This camera was positioned on a tripod approximately one metre from where the mother and infant would so as to capture mother and infant in profile. The floor area was set up for the infant to be comfortably positioned on his/her back on a rug. It was thought the mother and infant would be more relaxed for recording in this position rather than the researcher introducing an unfamiliar infant chair for the infant to sit in for the video recording session. The use of this interaction position is supported by the study by Lavelli and Fogel (2002) (see section 2.1.2) which found that infants in a ‘not-being held’ position (reclined on a sofa) were more responsive to mothers’ interactions than infants in a ‘being held’ position (in the mothers’ arms) as it provided freedom for them to move their limbs and display gestural responsiveness.

Two types of recording procedures occurred as follows:

1. Adult Directed Speech (ADS) of the mother describing three toys to the researcher – a small soft woollen sheep, a toddler sized lace-up shoe, and a shark puppet\textsuperscript{51} – was recorded at 48 kHz using a Sony DAT player with a

\textsuperscript{51} Appendix 18 Photograph of ‘sheep’, ‘shoe’ and ‘shark’ toys
Sony lapel microphone attached to the mother’s clothing. The mother was asked to describe each toy, the researcher encouraging the mother’s conversation until the words ‘sheep’, ‘shoe’ and ‘shark’ were used (at least six times to ensure enough words could be representative of a sample for analyses) during each description. The research assistant cared for the infant away from the mother’s view during this short time as otherwise the naturalness of the mother’s adult speech could be affected by the presence of her infant.

2. The mother-infant play session recording began with the mother carrying her infant to position her in the middle of the soft floor rug. The mother sat on the rug facing the infant and midline to the infant. Mothers were instructed to try not to reposition themselves or their infant as this may place them out of the view of the video camera. After the mother and infant were comfortable on the floor, the Sony DAT player was set-up and a lapel microphone was attached to the mother. Mother’s speech to her infant was recorded on the DAT player as this gave better recording quality than the camera. During the stages of the recording, the researcher and the assistant situated themselves away from the sight of the mother and infant so as not to hinder their interactive behaviour but were within hearing range of the their interactions. The researcher came back to the mother and infant at the conclusion of each stage.

The mother-infant play session consisted of three parts and proceeded as follows:

1. *Free Play* – Mothers and infants interacted without toys for the first 3 minutes. Mothers were instructed that they were to play freely with their infants for a few minutes before introducing toys to the play session. Recording began with the mother positioning the infant and herself on the floor rug.

2. *Toy Play* – After the 3 minutes of free play the researcher introduced the sheep, shoe and shark toys for the mother to engage the infant. Mothers were asked to play with their infants for another few minutes using the toys individually, and that as they played with the infants the words ‘sheep’,
‘shoe’ and ‘shark’ were spoken. If mothers had not sufficiently spoken to their infant using at least 6 samples of speech to identify each toy within a minute of playing with each toy, they were prompted by the researcher they needed to talk to the infant using the name of the toy. If mothers continued for longer than 1 minute playing with a toy and had already spoken at least 6 samples of the target words, the researcher prompted them by calling to complete and proceed to the next toy.

3. ‘Rhyme Play’ concluded the play session. When the researcher introduced the toys, mothers were also given a cue card with the rhyme and instructed that at the end of the toy play they were to conclude the recording session by reciting the rhyme twice to the infant. The rhyme is as follows:

Two little hands go clap, clap, clap,
Two little feet go tap, tap, tap,
And these little toes can touch Mummy’s nose.

Table 8.2 is a summary of the data collected, together with the function that was later extracted from these data.

Table 8.2
Data collected and its function

<table>
<thead>
<tr>
<th>Data Collected</th>
<th>Function of the Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-report Questionnaires</td>
<td>• Obtain participants’ general information</td>
</tr>
<tr>
<td></td>
<td>• Postnatal depression screening</td>
</tr>
<tr>
<td></td>
<td>• Maternal Post-Natal Attachment assessment</td>
</tr>
<tr>
<td>Video recording of mother-infant interaction during free play &amp; toy play</td>
<td>Observation ratings of dyadic reciprocity according to the quality of mother and infant behavioural exchanges</td>
</tr>
<tr>
<td>Mothers IDS and ADS recording using words ‘sheep, shoe and shark’</td>
<td>• To measure attentional and didactic components of IDS as a proportion of the same measures for ADS using mean pitch, pitch range and duration, and vowel triangle space of /i/, /u/, and /a/</td>
</tr>
<tr>
<td>Mothers IDS recording while playing with the infant using the toy sheep</td>
<td>• To rate IDS affective characteristics using scales of Communicative Intent</td>
</tr>
<tr>
<td>Mothers IDS recording reciting rhyme</td>
<td>• To measure Intonation using mean pitch, pitch range and duration of ‘And these little toes can touch Mummy’s nose’</td>
</tr>
</tbody>
</table>
Because of the variability in infants’ routines and mood states that affect their responsiveness, flexibility with the order of recording procedures was required. At times it was necessary for the play session to be recorded before the ADS recording. Taking into account testing time for the 44 mother-infant dyads, the total time period for completing Study 2 was ten months.

8.5.4 Measures
Self report questionnaires were used to request participant information, screen for postnatal depression and assess mothers’ perceived attachment to their infant. The Mother-Infant/Toddler Play observational scale was used to rate the quality of interactions of mothers and their infants. Details are as follows

8.5.4.1 Questionnaires
Three self-report questionnaires used in Study 1 were used in this study (see section 5.3.5 for details of these questionnaires).

1. The General Information Questionnaire\(^{52}\) at pre-test
2. The Edinburgh Postnatal Depression Scale (EPDS)\(^{53}\) at pre- and posttest
3. The Maternal Post-Natal Attachment Scale (MPNAS)\(^{54}\) at pre- and posttest

As described in section 5.3.5 the General Information Questionnaire which was devised by the researcher consisted of 16 items to obtain mothers’ demographics details, information regarding their pregnancy, social support, their health since giving birth, difficulties they may have experienced in their mothering role, and the infant’s health and behaviour. The Edinburgh Postnatal Depression Scale (Cox et al., 1987) was used to screen mothers for post-natal depression at pretest and to screen for the possible onset during the 5-week period. The Maternal Post-Natal Attachment Scale (Condon & Corkindale, 1998) was repeated in Study 2 so results could be compared with those of Study 1.

8.5.4.2. The Mother-Infant/Toddler Play Scale
Mother-Infant/Toddler Play scale\(^{55}\) (Chatoor, Getson & Himmelberg, 1985) consists of 24 items to rate the behavioural responsiveness and affect of the mother and 8

\(^{52}\) Appendix 9 General Information Questionnaire
\(^{53}\) Appendix 13 Edinburgh Postnatal Depression Scale
\(^{54}\) Appendix 16 Maternal Post-Natal Attachment Scale
items rating the infant’s mood state and responsiveness to the mother’s interactions during play. The scale is divided into four subscales and uses a four-point Likert-type format for rating the behaviours of mother-infant pairs from “none” to “very much”. Listed below are the subscales with the ranges of scores possible for each subscale.

1. **Maternal unresponsiveness to infant’s needs**
   
   Score range: 0 – 18 (indicating Responsiveness to Unresponsiveness)

2. **Maternal intrusiveness**
   
   Score range: 0 - 15 (indicating Non-Intrusiveness to Intrusiveness)

3. **Dyadic conflict**
   
   ‘Mother’ score range: 0 -12
   
   ‘Infant’ score range: 0 - 6
   
   ‘Mother’ and ‘Infant’ scores are summed to gain total
   
   Total score range: 0 – 18 (indicating No conflict to Conflict)

4. **Dyadic reciprocity**
   
   ‘Mother’ score range: 0 - 27
   
   ‘Infant’ score range: 0 - 18
   
   ‘Mother’ and ‘Infant’ scores are summed to gain total
   
   Total score range: 0 - 45 (indicating No Reciprocity to Reciprocity)

The original scale was devised specifically for toy play between mother and infant. As mothers and infants in Study 2 were rated during both ‘toy play’ and ‘free play’ (without toys) the wording of some items was modified by the researcher to adapt to the interaction situations of this study. These changes to the original scale were (i) **Dyadic reciprocity** – Items 3, 5 and 7, (ii) **Maternal intrusiveness** – Items 28 and 29, and (iii) **Dyadic Conflict** – Item 4.

Two raters, blind to participant information and experimental aims, were trained by the researcher in the use of the scale. The primary rater was a researcher and trained clinical psychologist; the other rater was a research assistant studying psychology at post-graduate level. The researcher wrote operational definitions for each item of the scale to provide the raters with concrete, observable measures for construct validity to the study (Mitchell & Jolley, 1996). Training consisted of the researcher

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35 Appendix 19 Mother-Infant/Toddler Play Scale
36 Appendix 20 The original version of The Mother-Infant/Toddler Play Scale
37 Appendix 21 Operational definitions for the Mother-Infant/Toddler Play scale
explaining the observational procedure and role-playing scenarios using an infant-sized doll and the sheep, shoe and shark toys for the raters to become familiar with the operational definitions. A pilot test of 8 mother-infant interaction samples of the play session was used for rating practise and to establish inter-rater reliability. A Cohen’s kappa index for inter-rater reliability\(^{58}\) of .725 was achieved with the raters independently scoring the first 20% of the mother-infant interactions. Inter-rater reliability of .729 was achieved for the following 20% of the observations. Given this high inter-rater reliability, the primary rater’s data were used for analyses. Table 8.3 outlines the mother-infant interaction situations that were rated according to the four subscales.

Table 8.3

*Subscales of the Mother-Infant/Toddler Play Scale and their application in assessing the quality of mother and infant interactions*

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Mother-Infant Interaction Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maternal unresponsiveness to infant’s needs</td>
<td>‘Free Play’ which included the mother’s initial positioning of the infant on the floor rug and the positioning of herself for interactions</td>
</tr>
<tr>
<td>• Mother-Infant dyadic reciprocity</td>
<td></td>
</tr>
<tr>
<td>• Maternal intrusiveness</td>
<td>‘Toy Play’ using the sheep, shoe and shark</td>
</tr>
<tr>
<td>• Mother-Infant dyadic conflict</td>
<td></td>
</tr>
</tbody>
</table>

‘Maternal unresponsiveness to infant’s needs’ and ‘Dyadic reciprocity’ were rated without toys in order to provide mothers with the opportunity to engage with their infants without the distraction of toys. Toy play provided the situation to assess *Maternal intrusiveness* and *Dyadic conflict*. The mother’s behaviour was rated according their intrusive use of the toys. Dyadic conflict was assessed according to mother/infant distress which occurred during these play interactions and the mother’s ability to regulate the infant’s mood with toys.

**8.5.5 Speech Analyses**

A subset of 12 M&M and 12 Control participants who were native speakers of Australian English were randomly selected from the full samples in each group for

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\(^{58}\) Appendix 22 Statistical results for Mother-Infant/Toddler Play scale inter-rater reliability
IDS and ADS analyses. The DAT recordings of mothers’ speech were converted to computerised *.wav Audio files for the PRAAT (Boersma & Weenink, 2004) analysis procedures. Following are the procedures involved used in the acoustic and phonetic analyses.

8.5.5.1 Vowel Analyses
The vowels /i/, /u/ and /a/ were extracted from the target words sheep, shoe and shark for the purpose of analysing mean pitch, pitch range, duration, and the F1 and F2 vowel formant frequencies. Using PRAAT Version 4.2.23 (Boersma & Weenink, 2004) frequency range for sampling data was set between 90Hz and 800Hz. IDS and ADS vowel samples were marked manually from the spectrogram for onset and offset of the vowel. All target words produced by the mothers during IDS and ADS were included for analysis unless the vowel was distorted by environmental noise or infant vocalisation; this accounted for approximately 6% of the recordings. PRAAT scripts were written to calculate each vowel’s mean pitch and pitch range in Hz, its duration in seconds, and its first and second formant values (F1 and F2 respectively).

Using a narrowband spectrogram and a PRAAT script written for autocorrelation LPC spectra for the locations of the formants, measurements were taken at the peak of the F1 and F2 amplitude for each vowel. If peaks of the formants could not be located, those samples were discarded. Mothers’ mean F1 and F2 values for /i/, /u/ and /a/ were used for the calculation of vowel triangle areas for IDS and ADS. Table 8.4 presents a summary of the number of vowels that were retained for analysis.

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59 All scripts used for PRAAT Version 4.2.23 were written by Dr Caroline Jones, Research Assistant, MARCS. University of Western Sydney.
Table 8.4

IDS and ADS total of vowels included for pitch analyses (bold entries) and formant analyses (italicized entries)

<table>
<thead>
<tr>
<th>Vowels</th>
<th>IDS</th>
<th>ADS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental Group</td>
<td>Control Group</td>
</tr>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>/i/</td>
<td>78 (76)</td>
<td>76 (75)</td>
</tr>
<tr>
<td>/u/</td>
<td>61 (61)</td>
<td>75 (73)</td>
</tr>
<tr>
<td>/a/</td>
<td>70 (68)</td>
<td>65 (64)</td>
</tr>
</tbody>
</table>

Subtotals 209 (205) 216 (212) 229 (226) 261 (257) 202 (195) 209 (193) 197 (191) 204 (184)

Totals 915 (900) 812 (763)

8.5.5.2 Intonation Analyses

Intonation of the mothers’ IDS was measured by the mean pitch, pitch range and duration of the last phrase of the rhyme that mothers recited to their infants to conclude the play session - *And these little toes can touch mummy’s nose*. These results were obtained using the same PRAAT script for calculating the vowels’ mean pitch, pitch range and duration. ADS was not collected for this rhyme.

8.5.5.3 Scales of Communicative Intent

Emotional and intentional characteristics of mothers’ speech when engaging with their infants were rated using the five scales of Communicative Intent\(^{60}\) (Burnham, Kitamura & Vollmer-Conna, 2002; Kitamura & Burnham, 2003): Scale 1 *Positive or Negative Affect*, Scale 2 *Intention to Express Affection*, Scale 3 *Intention to Encourage Attention*, Scale 4 *Intention to Comfort or Soothe* and, Scale 5 *Intention to Direct Behavior*.

Scale 1 used a 9-point rating of −4 (very high negative affect) to +4 (very high positive affect) and Scales 2-5 used a 5-point rating from 1 (not at all) to 5 (extreme).

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\(^{60}\) Appendix 23 Raters instructions and the 5 Communicative Intent Rating Scales
Forty eight IDS samples (24 pre- and 24 posttest samples) of 25 seconds duration were taken from the beginning of the toy play session when the mothers were showing the infants the sheep. This section was a standard part of the play procedure and was more appropriate for analysis than further into the toy play session when mothers often began ‘characterising’ being a shark by deepening their voice and distorting the quality of speech making it unusable for analysis. The task of rating the low pass filtered speech samples required naïve listeners. Following the procedure of Kitamura and Burnham (2003), the speech samples were Hann and low pass filtered at 400 Hz with 100 Hz smoothing using Praat Version 4.2.23. This low-pass filtering kept the intonation contours intact, but made individual phonemes and the words unintelligible. Samples were then randomly ordered and copied to CD with a 10 second silence between each sample to allow time for rating.

The task of rating the low pass filtered speech samples required naïve listeners. Following the procedure of Kitamura and Burnham (2003), who originated the communicative intent rating paradigm, thirty three first year undergraduate students (Mean age = 22.6 years) studying Psychology I at the University of Western Sydney Bankstown were recruited for the rating task. These students obtained course credit for their participation. The ratings were carried out in one session that took one hour including instruction time and practise examples. Students were given an instruction sheet regarding their task and the scales. The researcher read the instructions out to the students and then, using a portable Sony CD player, played two contrasting samples of mothers’ affective speech when interacting with their infants to familiarise the raters with low pass filtered IDS. Students were given the opportunity to ask questions. Following this the students practised rating on 6 training samples and their ratings were discussed to ensure they were clear on the task before rating of the 48 samples began. In an attempt to avoid fatigue, the researcher paused the session midway through the task for the raters to take a break for 3 minutes.

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61 The 25 seconds duration of speech for each sample was recommended by Dr Christine Kitamura. MARCS Auditory Laboratories, University of Western Sydney, in accordance with a previous study (Kitamura and Burnham, 2003)
8.6 Results

To investigate if M&M affects mothers’ behavioural and vocal interactions with their infants of 3 to 4 months on age, results will be presented according to the following measures:

1. Self report questionnaires
   (i) The Edinburgh Postnatal Depression Scale (Cox et al., 1987)
2. Mother-Infant/Toddler Play Scale (Chatoor et al., 1985)
3. Acoustic qualities of mothers’ speech according to (i) attentional characteristics of IDS compared to ADS (ii) hyperarticulation of IDS compared to ADS, (iii) intonation of IDS, and (iv) communicative intent of IDS

SPSS Version 12 was used for statistical analyses. Detailed output of statistical results are presented as appendices in the CD labelled CD Results. Unless stated otherwise a 2 x (2) design was employed, with Time (pre- and post-test) as the within-subjects factor and Group (M&M and Control) as the between-subjects factor.

8.6.1 Questionnaires

Results of The Edinburgh Postnatal Depression Scale and the Maternal Post-Natal Attachment Scale were obtained using split-plot analyses of variance (ANOVAs). If additional analyses were employed, the procedures are noted. Alpha was set at .05 unless stated otherwise.

8.6.1.1 Edinburgh Postnatal Depression Scale (EPDS)

The pre- and post-test results\(^{62}\) are graphically represented in Figure 8.1. The M&M group’s mean pretest score of 6.9 (SD=3.7) decreased to 5.4 (SD=3.2) at post-test and the Control group’s mean scores decreased from 6.2 (SD=2.3) to 4.7 (SD=2.9). These scores indicate both groups were within the low risk category for postnatal depression.

\(^{62}\) CD Appendix 16 Statistical output of EPDS split-plot ANOVA results
Results showed a significant main effect of Time \([F (1, 42) = 10.849, p = .002, \text{partial } \eta^2 = .205]\) but no significant interaction of Time with Group, nor a between-subjects effect of Group. These results show that over the 5-week period the mothers’ Edinburgh Postnatal Depression Scale scores decreased as a factor of Time.

### 8.6.1.2 Maternal Post-Natal Attachment Scale (MPNAS)

Results\(^63\) are presented as three individual domains - Quality of Attachment, Absence of Hostility and Pleasure of Interactions - and Total Attachment.

The Quality of Attachment scores can range from 9 (low quality) to 45 (high quality). Pre- and post-test mean scores are graphically represented in Figure 8.2 illustrating an increase for the M&M group from 40.8 (SD=2.4) to 42.4 (SD=1.9) and a decrease for the Control group from 40.9 (SD=2.7) to 40.2 (SD=2.7). There was no significant between-subjects effect of Group, or within-subjects main effect of Time but a significant interaction of Time x Group \([F (1, 42) = 15.478, p = .000, \text{partial } \eta^2 = .269]\), indicating an increase for the M&M group, and a decrease for the Control group.

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\(^63\) CD Appendix 17 Statistical output of split-plot ANOVA results for Maternal Postnatal Attachment scale and paired t-test results
The Absence of Hostility scores can range from 5 (high hostility) to 25 (low hostility). Pre-and post-test mean scores are graphically represented in Figure 8.3 illustrating an increase for the M&M group from 19.7 (SD=2.4) to 21.0 (SD=4.2) and a decrease for the Control group from 20.6 (SD=2.2) to 20.2 (SD=2.3). Similar to the results of Quality of Attachment, the Absence of Hostility results show no significant main effect of Group or Time but a significant interaction of Time x Group \[F(1, 42) = 7.051, p = .011, \text{ partial } \eta^2 = .144\], indicating an increase for the M&M group, and a decrease for the Control group.

The Pleasure of Interactions scores can range from 5 (low pleasure) to 25 (high pleasure). Figure 8.4 graphically illustrates the mean scores showing an increase for both groups over the 5-week period. The M&M group’s increase was from 20.8
(SD=3.5) to 22.5 (SD=2.5) and the Control group’s was from 21.3 (SD=3.1) to 21.5 (SD=2.5). Results show a significant main effect of Time \( [F(1, 42) = 5.160, p = .028, \text{partial } \eta^2 = .109] \), but no significant main effect of group, or interaction of Time x Group. Both groups’ mean scores increased as an effect of Time, and although Figure 8.4 shows that this increase was greater for the M&M group, it can be seen that the variation was high, yet there was no significant difference between the increases.

![Pleasure of Interaction](image)

*Figure 8.4 Pleasure of Interaction* pre- and post-test mean scores. Error bars represent standard error of the mean.

*Total Attachment* scores can range from 19 (low attachment) to 95 (high attachment). Figure 8.5 illustrates the pre- and post-test mean scores showing the M&M group’s increased from 81.2 (SD=6.4) to 85.8 (SD=5.4) and the Control group’s decreased from 82.7 (SD=5.9) to 81.8 (SD=5.0) over the 5 weeks. Results show no significant between-subject effect of Group, but there was a significant main effect of Time \( [F(1, 42) = 10.103, p = .003, \text{partial } \eta^2 = .194] \), and a significant interaction of Time x Group \( [F(1, 42) = 20.693, p = .000, \text{partial } \eta^2 = .330] \), indicating an increase for the M&M group, and a decrease for the Control group.
A summary of the results for the Maternal Post-Natal Attachment Scale are shown in Table 7.5. Overall, the results indicate M&M had an effect on the M&M mothers’ perceived attachment to their infants. As was found in Study 1, results generally show the M&M group significantly increased and the Control group decreased over the 5 weeks. The only exception was the Pleasure of Interactions results which showed that both groups increased over Time.

Table 8.5

The Effects of Time, Group (between-subjects) and Time x Group on Maternal Postnatal Attachment and group increase/decrease of mean scores

<table>
<thead>
<tr>
<th>Scale Domain</th>
<th>Time</th>
<th>Group</th>
<th>Time x Group</th>
<th>M&amp;M Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Attachment</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>↑*</td>
<td>↓</td>
</tr>
<tr>
<td>Absence of Hostility</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>↑*</td>
<td>↓</td>
</tr>
<tr>
<td>Pleasure of Interactions</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>↑*</td>
<td>Minimal Change</td>
</tr>
<tr>
<td>Total</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>↑*</td>
<td>↓</td>
</tr>
</tbody>
</table>

✓ Indicates significant effect ✗ Indicates no significant effect
↑ Indicates increase of mean score over time ↓ Indicates decrease of mean score over time
* Indicates significant change over time as calculated by Paired Samples t-test at $\alpha=0.01$
8.6.2 The Mother-Infant/Toddler Play Scale
The results are reported according to the four subscales: Maternal Unresponsiveness to Infants Needs, Dyadic Conflict, Maternal Intrusiveness and Dyadic Reciprocity. Data were screened for outliers and as a consequence the data of one dyad was excluded from each group, so the number of participants per group was reduced to 21 for split-plot ANOVA analyses.

Scores for Maternal Unresponsiveness to Infant’s Needs can range from 0 (highly responsive) to 18 (highly unresponsive). Figure 8.6 graphically illustrates pre- and post-test mean scores showing the M&M group increased slightly from 2.1 (SD=1.3) to 2.3 (SD=2.0) and the Control group’s decrease was minimal, from 2.6 (SD=1.8) to 2.5 (SD=1.1). Results showed no significant main effect of Time or interaction of Time x Group nor was there a between-subjects effect of Group. Although these results showed there was little change over the 5 weeks, the low mean scores indicate that the mothers of both groups were very responsive to their infants needs.

![Maternal Unresponsiveness](image)

Figure 8.6 Maternal Unresponsiveness to Infant’s Needs pre- and post-test mean scores. Error bars represent standard error of the mean.

Dyadic Conflict scores can range from 0 (no conflict) to 18 (much conflict). Figure 8.7 graphically illustrates pre- and post-test mean scores showing a minimal increase for both groups. The M&M group’s increase was from 0.4 (SD=0.8) to 0.8 (SD=1.2) and the Control group’s was from 0.8 (SD=1.3) to 1.0 (SD=2.3). However, results showed no significant main effect of Time or interaction of Time x Group, nor was there a between-subjects effect of Group. These results indicate that mother-infant conflict was very low for both groups.

\(^{64}\) CD Appendix 18 Statistical output of Maternal Unresponsiveness, Dyadic Conflict and Maternal Intrusiveness results

\(^{65}\) CD1 Appendix 19 Statistical output of Dyadic Reciprocity results
Results showed there was a significant main effect of Time \([F (1, 40) = 5.264, p = .027, \text{ partial } \eta^2 = .116]\), but no significant interaction of Time x Group, indicating that mothers became less intrusive over the 5 weeks irrespective of group. There was however a significant between-subjects effect of Group \([F (1, 40) = 10.214, p = .003, \text{ partial } \eta^2 = .203]\) showing the Control group’s mean score were greater than those of the M&M group, but in the absence of a significant interaction it is difficult to interpret this effect.
To calculate the *Dyadic Reciprocity* scores, which can range from 0 (lowest reciprocity) to 45 (highest reciprocity) the *Mother* and *Infant* domains were scored separately (*Mothers* scores can range from 0-27 and *Infants* scores can range from 0-18). The total *Dyadic Reciprocity* is the sum of *Mother* and *Infant* scores. A more stringent criterion for $\alpha (.01)$ was applied for the split-plot analyses as Levene’s test showed there was a violation of the homogeneity of variance for the *Mother* and *Total Dyadic* post-test results.

Figures 8.9 and 8.10 illustrate the domains of *Mother* and *Infant* pre- and post-test mean scores. As illustrated the M&M group for both Mother and Infant results increased over the 5 weeks and those of the Control group decreased.

**Figure 8.9** *Mothers’* reciprocity pre- and post-test mean scores. Error bars represent standard error of the mean

**Figure 8.10** *Infants’* reciprocity pre- and post-test mean scores. Error bars represent standard error of the mean
Results showed that for the *Mother* domain there was no main effects of Group or Time but a significant interaction of Time x Group \[F (1, 40) = 8.208, \ p = .007, \ \text{partial } \eta^2 = .170\], indicating an increase over time for the M&M group, and a decrease for the Control group. For the *Infant* domain there was a similar pattern of results, but in this case the analyses showed no significant effects of Group, Time, or Time x Group. Thus, while there was an increase for M&M and a decrease for Control for both the *Mother* and the *Infant* domains, it appears that the differential was greater for the mothers’ scores.

The total *Dyadic Reciprocity* scores are illustrated in Figure 8.11. *Dyadic Reciprocity* pre- and post-test mean scores of the M&M group increased from 25.2 (SD=6.2) to 29.4 (SD=3.8) and the Control group decreased from 27.8 (SD=9.6) to 25.6 (SD=6.4). Results showed no significant main effect of Group or Time, but a significant interaction of Time x Group \[F (1, 40) = 5.844, \ p = .020, \ \text{partial } \eta^2 = .127\] indicating the mother-infant reciprocity increased significantly for the M&M group, and decreased for the Control group.

![Dyadic Reciprocity](image)

*Figure 8.11 Dyadic Reciprocity* pre- and posttest results of Mother-Infant Play Scale. Error bars represent standard error of the mean.

Table 8.6 summarises the results of the rated observations of the Mother-Infant/Toddler Play Scale. There was minimal change that occurred over the 5-week period for both the M&M and the Control groups’ mean scores for *Maternal Unresponsiveness to Infants Needs* and *Dyadic Conflict*. There was, however, a significant main effect of Time for *Maternal Intrusiveness* results, with both the M&M and the Control groups’ mean scores decreasing, indicating mothers became less intrusive with their infants during the play interactions over the 5 weeks. The *Dyadic Reciprocity* results showed a significant Time x Group interaction, indicating
the M&M group’s mother-infant reciprocity significantly increased significantly over the 5 weeks and that of the Control group decreased.

Table 8.6

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Time</th>
<th>Group</th>
<th>Time x Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Unresponsiveness</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Dyadic Conflict</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Maternal Intrusiveness</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Dyadic Reciprocity</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ Indicates significant result
✗ Indicates no significant result

8.6.3 The Effect of M&M on Acoustic Qualities of Mothers’ Infant-Directed and Adult-Directed Speech

The following results relate to the subset of the original sample - 24 native speakers of Australian English, 12 in the M&M and 12 in the Control group.

8.6.3.1 IDS Mean Pitch, Duration and Range of Vowels /i/, /u/ and /a/

To investigate if M&M had an effect on the attentional characteristics of mothers’ IDS, ADS values were used to provide a baseline for these results. Split-plot ANOVA results of the 2 x (2) design were obtained using proportional scores of the mean pitch, duration and range of mothers’ IDS by dividing the IDS mean scores by ADS mean scores. Alpha was set at .01 for these analyses as Levene’s test showed there were violations of the homogeneity of variance for the pretest results of pitch range and duration.

Mean Pitch

Figure 8.12 illustrates the IDS and ADS pre- and post-test results of the mean pitch of the vowels. The IDS results indicate an increase in the M&M group’s mean and a decrease in the Control group’s mean. Similarly, the ADS results show an increase for the M&M group and a decrease in the Control group.
Figure 8.12 Mean pitch pre- and post-test results of IDS and ADS vowels /i/, /u/, /a/. Error bars represent standard error of the mean.

Results\textsuperscript{66} of the IDS pitch/ADS pitch show there was no significant between-subjects effect of Groups, but there was a significant main effect of Time [F (1, 70) = 7.029, p = .010, partial $\eta^2 = .091$], and of Time x Group [F (1, 70) = 4.399, p = .040, partial $\eta^2 = .059$], indicating that the relative pitch of the M&M group’s IDS increased as an effect of M&M over the 5 weeks, but that there was minimal change over time for the Control group, as shown in Figure 8.13.

Figure 8.13 IDS vowel pitch represented as a proportion of ADS. Error bars represent standard error of the mean.

\textit{Duration}

Figure 8.14 illustrates the IDS and ADS pre- and post-test results of the mean duration (measured in seconds) of the vowels. The IDS results indicate an increase in

\textsuperscript{66} CD Appendix 20 Statistical output of results for mean pitch for IDS and ADS results
duration for the M&M group and a decrease for the Control group. The ADS results show minimal change over time for the both the M&M and Control groups.

**Figure 8.14** Mean duration pre- and post-test results of IDS and ADS vowels /i/, /u/, /a/. Error bars represent standard error of the mean.

Results\(^{67}\) of analysis of the IDS duration/ADS duration show there was no significant between-subjects effect of Group, a significant main effect of Time \([F (1, 70) =6.266, p = .015, \text{partial } \eta^2 = .082]\), and a significant Time x Group interaction \([F (1, 70) =13.429, p = .000, \text{partial } \eta^2 = .161]\). These proportional results indicate that the duration of the M&M group’s IDS increased as an effect of M&M over the 5 weeks and the Control group decreased, as shown in Figure 8.15.

**Figure 8.15** IDS vowel duration represented as a proportion of ADS. Error bars represent standard error of the mean.

**Pitch Range**

Figure 8.16 illustrates the IDS and ADS pre- and post-test results of the mean range (measured in Hz) of the vowels /i/, /u/, /a/. The IDS results indicate an increase in the

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\(^{67}\) CD Appendix 21 Statistical output of results for mean duration for IDS and ADS
M&M group’s mean and a decrease in the Control group’s mean. The ADS results show minimal change for both the M&M and Control groups.

Figure 8.16 Pitch range pre- and post-test results of maternal IDS and ADS vowels /i/, /u/, /a/. Error bars represent standard error of the mean.

Results of the IDS range/ADS range show there was no significant between-subjects effect of Group, no significant main effect of Time, but a significant Time x Group interaction [F (1, 70) =4.942, p = .029, partial η² = .066]. As a proportion of their ADS the M&M group’s range of IDS increased over the 5 weeks indicating an effect of M&M and that of the Control group decreased, as shown in Figure 8.17.

Figure 8.17 IDS vowel range represented as a proportion of ADS. Error bars represent standard error of the mean.

Summarising the IDS results of the mean pitch, duration and range of vowels /i/, /u/, and /a/, analyses of the IDS/ADS proportions showed the M&M group increased from pre- to post-test for all attentional characteristics of their IDS, whereas the Control group decreased in the duration and range of vowels. Although the Control group’s mean pitch scores showed a decrease over the 5 weeks the IDS/ADS

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68 CD Appendix 22 Statistical output of results for mean pitch range for IDS and ADS
proportion results showed there was minimal change. These results indicate that compared to a no-treatment control group, M&M had an effect on mothers’ attentional characteristics of their speech.

8.6.3.2 Hyperarticulation of Vowels /i/, /u/ and /a/

The vowel triangles illustrated in Figures 8.18 – 8.21 represent the groups’ pre- and post-test IDS and ADS mean F1 and F2 values of the vowels /i/, /u/ and /a/. The M&M group’s IDS triangles illustrate a slight difference in the shape from pre- to post-test although they are similar in area. Their ADS triangles show there was little change in the areas over the 5 weeks indicating there was likely to have been little change in this group’s articulation. The Control group’s IDS triangles illustrate a minimal decrease in area from pre- to post-test and the ADS post-test triangle area reduced to represent a line, indicating a decrease in their ADS.

Vowel triangle areas for mothers ADS and IDS were calculated using the formula \( \frac{1}{2} \times (X_1(Y_2-Y_3) + X_2(Y_3-Y_1) + X_3(Y_1-Y_2)) \) where \( X \) and \( Y \) were the mean F1 and F2 values and 1, 2, and 3 were the point vowels /i/, /u/ and /a/ (Andruski, J.E., Kuhl P.K. & Hayashi, A, 1999; and see section 3.2.2.3)
To measure vowel hyperarticulation, IDS vowel triangle areas are expressed as a proportion of ADS vowel triangle areas as illustrated in Figure 8.22. A more stringent criterion for $\alpha$ (.01) was applied for the split-plot analyses as Levene’s test showed there was a violation of the homogeneity of variance for the IDS/ADS vowel triangle post-test results. Results\(^{70}\) of the triangles IDS areas/ADS areas show there was no significant main effect of Time or any significant Time x Group interaction. There was however a significant between-subjects effect of Group [F (1, 22) =12.253, $p = .002$, partial $\eta^2 = .358$]. There was an initial difference between the two groups which can only be an effect of sampling, and this difference increased over time, presumably because of the decreases in triangle area of the Control group’s ADS from pre- to post-test. However, as there were no effects of Time or Time x Group these changes over time were not significant.

\(^{70}\) CD Appendix 23 Statistical output of Hyperarticulation results
Figure 8.22 IDS vowel triangle areas represented as a proportion of the ADS vowel triangle areas. Error bars represent standard error of the mean.

Summarising the articulation results of the mothers’ IDS speech compared to their ADS speech, neither the M&M group nor the Control group showed any significant change in the degree of hyperarticulation (IDS/ADS) from pre- to post-test. Thus, unlike the attentional characteristics of the IDS, there was no effect of the M&M program on vowel hyperarticulation.

### 8.6.3.3 Intonation of Mothers’ IDS

To investigate the effect M&M had on the intonation of mothers’ IDS, a split-plot 2 (Group) x (2) Time ANOVA was employed to analyse pre- and post-test mean pitch, duration, and pitch range for the phrase - ‘And these little toes can touch Mummy’s nose’ Alpha was set at $\alpha=.01$ analyses as Levene’s test showed there was a violation of the homogeneity of variance for mean pitch post-test results.

Figure 8.23 illustrates the pre- and post-test mean pitch for the phrase showing an increase for the M&M group and a small decrease for the Control group over time. Results$^{71}$ show there was no significant effects of Group or Time but a significant interaction of Time x Group $[F (1, 22) = 4.317 \ p = .050$, partial $\eta^2 = .164]$ over the 5 weeks indicating a significant increase for the M&M groups mean pitch of the IDS.

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$^{71}$ CD Appendix 24 Statistical output of intonation measures of maternal IDS
Figure 8.23 Mean pitch pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.

Figure 8.24 illustrates the pre- and post-test mean duration of the phrase showing an increase for both the M&M group and the Control group. Results show there was no significant effect of Group, Time, or Time x Group. Although there was a greater increase from pretest to posttest for the M&M group, and a minimal increase for the Control group, this difference was not significant.

Figure 8.25 illustrates the pre- and post-test mean range of the phrase showing an increase for the M&M group and a decrease for the Control group. Results show there was no significant effect of Group or Time, but a significant interaction of Time x Group \( F(1, 22) = 6.454 \ p = .019, \ \text{partial} \ \eta^2 = .227 \) indicating an increase for the M&M group and a decrease for the Control group over the 5 week period.
In summary, there was a significant increase in both the pitch measures (mean and range) for the M&M compared to decreases for the Control group. A similar pattern of results was obtained for mean duration, but this was not significant.

### 8.6.3.4 Communicative Intent Scales

To investigate if M&M had an effect on the communicative intentions of mothers’ IDS, results\(^\text{72}\) of the 5 rated scales (Positive or Negative Affect, Intention to Express Affection, Intention to Encourage Attention, Intention to Comfort or Soothe and Intention to Direct Behavior) were obtained using split-plot ANOVA analyses of the 2 (Groups) x 2 (Time) design, and the variable of Raters was included as a covariate to account for any variability of raters’ scoring that may have affected the results.

**Scale 1 Positive or Negative Affect**

Figure 8.26 illustrates the pre- and post-test mean scores for Positive or Negative Affect showing minimal change in both groups over the 5 weeks, especially given that this scale ranges from -4 to +4. Results show there was no significant effects of Group, Time, Raters or Time x Group.

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\(^{72}\) CD Appendix 25 Statistical results output of Communicative Intent Scales
Figure 8.26 Positive or Negative Affect pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.

Scale 2 Intention to Express Affection
Figure 8.27 illustrates a minimal change of Intention to Express Affection for both the M&M and Control groups’ mean scores from pre- to post-test. The possible range of scores for this scale and the three remaining scales is from 1 to 5, so it can be seen that, these changes for this scale are relatively inconsequential.

Figure 8.27 Intention to Express Affection pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.

Results showed there was no significant main effect of Time or significant Time x Group interaction. There was however a between-subject effect of Raters \[ F(1, 789) = 14.356, \ p = .000, \text{ partial } \eta^2 = .018 \] showing variance with the raters scoring between the two groups. Therefore it is possible the results for this scale may not be reliable because of this variability.

Scale 3 Intention to Encourage Attention
Figure 8.28 shows that the M&M group’s mean Intention to Encourage Attention decreased from pre- to post-test while the Control group’s mean remain relatively
unchanged. Results showed no significant effect of Group, but a significant main effect of Time \( F(1, 789) = 3.684, p = .055, \) partial \( \eta^2 = .05 \), and a significant interaction of Time x Group \( F(1, 789) = 5.084, p = .024 \) partial \( \eta^2 = .006 \), indicating that the M&M group decreased over time while the Control group did not. There was also a significant between-subjects effect of Raters \( F(1, 789) = 7.356, p = .007 \) partial \( \eta^2 = .001 \) showing a difference of the raters’ scoring between the groups. Similar to the results of *Intention to Express Affection*, the results for this scale could also be an effect of the raters’ variability and therefore results may not be reliable.

**Intention to Encourage Attention**

![Graph](image)

*Figure 8.28 Intention to Encourage Attention* pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.

Scale 4 *Intention to Comfort or Soothe*

Figure 8.29 illustrates that both groups’ mean *Intention to Comfort or Soothe* decreased slightly from pre- to post-test. Results showed there was no significant main effect of Group, Time, or Raters, and no significant Time x Group interaction.

**Intention to Comfort or Soothe**

![Graph](image)

*Figure 8.29 Intention to Comfort or Soothe* pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.
Scale 5 Intention to Direct Behaviour

Figure 8.30 illustrates a minimal decrease in the M&M groups’ mean Intention to Direct Behaviour from pre- to post-test and a minimal increase for the Control group. Results of statistical analyses show there was no significant main effect of Time or significant Time x Group interaction. There was however between-subjects effects of Raters [F(1, 789) = 34.856, p = .042 partial η² = .042] and Group [F(1, 789) = 11.554, p = .001 partial η² = .014] indicating significant differences of the mean scores between the groups and in the raters’ scoring of the two groups. The significant variance in the raters’ scoring could well have been an affect on the significant between-subject results of the two groups. Similar to the results of Intention to Express Affection and Intention to Encourage Attention, the results for this scale may not be reliable.

![Figure 8.30 Intention to Direct Behaviour pre- and post-test results of maternal IDS. Error bars represent standard error of the mean.](image_url)

Summarising the results of the change in Communicative Intent of mothers’ IDS from pre- to post-test, Table 8.6 shows there was no significant difference between the M&M and Control groups’ results with the exception of the Intention to Encourage Attention scale, in which the M&M group significantly decreased over the 5 weeks compared to the Control group which did not. However, the results for this scale also indicated there was a significant effect of the raters’ variance in scoring the results. It is possible the results of the M&M group were due to an effect of raters’ variability, although it should be noted that there was an effect of raters for Affection and Direct Behaviour which were not accompanied by a significant Time x Group effect. The mean scores of the mothers’ IDS indicated they were within a low to moderate range for expressing Positive Affect and were within a moderate range for the other 4 scales.
Table 8.7
The effects of Time, Group, Raters and Time x Group on the Communicative Intent of Mothers’ IDS

<table>
<thead>
<tr>
<th>Scale</th>
<th>Time</th>
<th>Group</th>
<th>Raters</th>
<th>Time x Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive or Negative Affect</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Intention to Express Affection</td>
<td>✗</td>
<td></td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Intention to Encourage Attention</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Intention to Comfort or Soothe</td>
<td>✗</td>
<td></td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Intention to Direct Behaviour</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
</tbody>
</table>

8.6.4 Summary
Table 8.8 summarises the main findings of Study 2 incorporating the predictions made in section 8.4.

Table 8.8
Study 2 summary of results incorporating predictions of the mother-infant behavioural interactions and maternal IDS as an effect of Music and Movement

<table>
<thead>
<tr>
<th>Measures of mother-infant behavioural interactions and maternal IDS characteristics</th>
<th>Groups Results indicating increase or decrease over the 5-week period</th>
<th>Prediction Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh Postnatal Depression scale</td>
<td>↓*</td>
<td>✓✓</td>
</tr>
<tr>
<td>Maternal Postnatal Attachment</td>
<td>↑*</td>
<td>✓✓</td>
</tr>
<tr>
<td>Dyadic reciprocity</td>
<td>↑*</td>
<td>✓✓</td>
</tr>
<tr>
<td>IDS/ADS vowels - Mean Pitch</td>
<td>↓*</td>
<td>✓✓</td>
</tr>
<tr>
<td>IDS/ADS vowels - Mean Duration</td>
<td>↑*</td>
<td>✓✓</td>
</tr>
<tr>
<td>IDS/ADS vowels – Pitch Range</td>
<td>↓*</td>
<td>✓✓</td>
</tr>
<tr>
<td>Vowel Hyperarticulation - IDS/ADS vowel triangle areas</td>
<td>Minimal change</td>
<td>✓</td>
</tr>
<tr>
<td>Intonation of IDS – Mean Pitch</td>
<td>↑*</td>
<td>✓✓</td>
</tr>
<tr>
<td>Intonation of IDS – Mean Duration</td>
<td>↓</td>
<td>✓</td>
</tr>
<tr>
<td>Intonation of IDS – Pitch Range</td>
<td>↑*</td>
<td>✓✓</td>
</tr>
<tr>
<td>Communicative Intention to Encourage Attention</td>
<td>↓*</td>
<td>✓</td>
</tr>
<tr>
<td>Communicative Intention to Positive or Negative Affect, Express Affection, Comfort and Soothe, Direct behaviour</td>
<td>Minimal change</td>
<td>✓</td>
</tr>
</tbody>
</table>

† Indicates an increase  ✓✓ Results Predicted and Significant
↓ Indicates a decrease          ✓ Results Predicted and Not Significant
* Indicates significant change         ✗ Results Not Predicted
From Table 8.8, it can be seen that the results of Study 2 showed that as an effect of M&M, the mothers’ perceived maternal post-natal attachment to their infants increased significantly and the Control group decreased over the 5-week period, confirming the maternal post-natal attachment results of Study 1. Results of the Mother-Infant/Toddler Play Scale that objectively measured mother-infant behavioural interactions during play showed M&M significantly enhanced dyadic reciprocity in the M&M group over the 5 week period, although it seems that this was mostly due to significant changes in the Mother domain. As predicted, without M&M dyadic reciprocity in the Control group decreased.

Results for mothers’ attentional characteristics in their IDS showed increases as an effect of M&M. During mother-infant play interactions the M&M group’s mean pitch, duration, and pitch range of the vowels in the words sheep, shoe, and shark significantly increased and, as predicted, the Control group’s mean scores decreased over the 5 weeks. Similar results were found for the intonational changes, the mean pitch, duration and pitch range in the phrase ‘And these little toes can touch Mummy’s nose’. The M&M mothers increased (significantly for mean pitch and range) the intonation of their speech over time when playing with their infants and the Control group decreased, as was predicted. In addition, the hyperarticulation results supported the predictions: M&M had no differential effect on vowel hyperarticulation compared to the Control group, and changes were in fact minimal. Contrary to the predictions, results of the scales of Communicative Intent showed the M&M treatment did not affect communicative intention of the mothers’ IDS over the 5 weeks.

In summary, these results support the predictions that the M&M program would enhance the attentional functions of mothers’ speech when interacting with their infants (measured by mean pitch, pitch range, and duration of their IDS) and mother-infant behavioural interactions resulting in an increase in dyadic reciprocity. Moreover, as a result of not having the M&M intervention, dyadic reciprocity of the mother and infant decreased along with attentional characteristics of IDS. The results also support the prediction that mothers’ linguistic/didactic function of speech would not be affected by M&M. Vowel hyperarticulation did not change as a result of M&M. However, results did not support the prediction that mothers’ communicative
intention of their speech would change as a function of the M&M program. Thus it is the dyadic interaction of mother-infant behaviour and the attentional aspects of mothers’ speech that is enhanced by the M&M program, and not the affective communicative intention or didactic aspects of their IDS. It awaits further research to determine whether early changes in dyadic interaction and the attentional aspects of IDS might result in later gains in infants’ development and the mother-infant relationship.
CHAPTER 9

Discussion and Conclusions:
The Effects of Music and Movement on
Mother-Infant Interactions
This chapter brings together the research results of this dissertation. The discussion begins with a summary of the results of Study 1 and Study 2. Then the combined results are considered, and interpretations offered and implications considered. Limitations of the research are then discussed together with suggestions for future research directions.

9.1 Summary of Results

9.1.1 Study 1 Results - The role of M&M Instruction and Social Interaction in the Efficacy of a Music and Movement Program for First-Time Mothers and Infants.

Study 1 investigated the effect of music and movement activities (M&M) on the type and frequency of mothers’ interactions with their infants and maternal well-being over a 5-week period. Face-to-face social contact (F2F) associated with the method of instructing the mothers using M&M was also considered as a factor that could affect the mothers’ well-being and interactions with their infants. As research has found, the types and degree of social support given to mothers in the early post-partum months of the developing mother-infant relationship can affect mothers’ mood states (Cutrona & Troutman, 1986; Porter & Hsu, 2003) and maternal competence (Warren, 2005) (see section 1.3). Thus, the factors of M&M and F2F contact were combined to result in four test groups. These were two M&M groups – M&M-F2F and M&M-Only – and two No M&M groups – F2F-Only and Control. The content of the M&M program was also investigated as to what types of activities mothers reported as preferring to practise. Three aims were formed: (1) To determine the effects of Music and Movement (M&M) and Face-to-Face (F2F) contact on the frequency of mothers’ interactions with their infants; (2) To determine the effects of M&M and F2F contact on maternal well-being, and (3) To assess the M&M-F2F and M&M-Only groups’ evaluations of the M&M program.

For Aim 1, 5 dependent variables relating to the types of activities mothers used to interact with their infants were investigated. These were Music and Enjoyment of Interactions, Movement Interactions, Touch Interactions, Play Interactions and Social Interactions. The M&M-Only group showed significant increases for all 5
types of interactions, while the M&M-F2F group showed significant increases for only two. Indeed, these two, *Music and Enjoyment of Interactions* and *Movement Interactions* demonstrated a decrease for the No M&M groups. The presence of F2F contact had no effect on mothers’ interactions. It was in fact the absence of F2F contact which had an effect on increasing *Play Interactions* and *Touch Interactions*. Results of *Social Interactions* showed there was no effect of M&M or F2F contact. These results show the self-instruction program was of greater influence in enhancing mothers’ interactions with their infants than the group instruction program.

For Aim 2, maternal well-being was measured by The Maternal Attitudes Questionnaire, Parenting Stress Index/Short Form and Maternal Post-Natal Attachment Scale. Similar to the results reported under Aim 1, there was no effect of F2F contact on these measures of the mothers’ well-being. Results of the Maternal Post-Natal Attachment Scale showed there was a significant effect of M&M on mothers’ perceived attachment to their infants over the 5 weeks. Results of the No M&M groups showed a decrease on this measure over time.

Results of Aim 3 showed there were no statistical differences between the M&M-F2F group and the M&M-Only group evaluations of the M&M program. Both groups of mothers reported the program increased their repertoire of music and movement activities and their enjoyment of interactions with their infants. Regarding the program content, mothers of both groups reported that up-tempo songs and rhymes that incorporated rhythmical movement were practiced more frequently than other M&M activities in the program.

While these results provided evidence on first-time mothers’ reported experience of the effects the M&M program had on their interactions with their infants and mother-to-infant attachment as a measure of maternal well-being, further investigation was required to gain objective behavioural evidence. To determine if the M&M program as an intervention could effectively enhance the quality of mother and infant interactions, changes in mothers’ Infant-Directed Speech (IDS) and dyadic behavioural exchanges during play were investigated in Study 2.
9.1.2 Study 2 Results - The role of M&M Instruction on Dyadic Interaction and Mothers’ Infant-Directed Speech

As Study 1 found there were no effects of the presence of F2F contact on mothers’ interactions with their infants and maternal well-being, and there were no effects of F2F contact on M&M, this study concerned only the effects of the M&M program using the self-instruction method. Two groups were formed, the M&M group and the No Treatment Control group, to investigate the effects of M&M on mother and infant behavioural exchanges and mothers’ IDS. The infants of Study 2 at recruitment were aged from 3 to 4 months to minimise potentially confounding effects that their development could have had on their observed responsiveness to their mothers’ interactions.

The effects of M&M on mother and infant behavioural exchanges over the 5-week period were assessed by the observational ratings of the Mother-Infant/Toddler Play scale (Chatoor, Getson & Himmelberg, 1985) which determined changes in dyadic reciprocity. Changes in the quality of mothers’ speech to their infants during interactions as an effect of M&M were measured by the acoustic characteristics associated with the attentional, affective and linguistic function of their IDS.

9.1.2.1 Mother-Infant Behavioural Exchanges

Results of the Mother-Infant/Toddler Play Scale (Chatoor, Getson & Himmelberg, 1985), presented according to the observational ratings of the 4 subscales – Maternal Unresponsiveness to Infants Needs, Dyadic Conflict, Maternal Intrusiveness and Dyadic Reciprocity – were in general reflective of the mothers developing normal interactions with their infants during play. The subscales of Maternal Unresponsiveness to Infants Needs and Dyadic Conflict showed M&M had no significant effect over the 5 weeks, and results of Maternal Intrusiveness showed mothers in both groups became less intrusive during play interactions with their infants over time. In contrast, Dyadic Reciprocity showed a significant increase over the 5 weeks for those mothers using the M&M activities. Without the M&M intervention mother-infant reciprocity decreased. These latter results were predicted based on the results of Study 1 and literature presented suggesting that mothers’ use of music and movement with their infants positively enhances the dyadic relationship (Trehub & Trainor, 1998).
The *Dyadic Reciprocity* subscale rated mothers’ engagement and exchanges with their infants according to the physical positioning of themself to the infant, their display of interest using gestures and pleasure expressed in the tone of speech, the affectionate and encouraging use of language and the mothers’ mood states. The infants’ engagement and exchanges with their mothers are rated according to their maintaining of visual contact, the pleasure they gained (smiling and vocalising) during the play interaction, and their attempt to exchange interactions with their mothers using motor actions of hand/arms and foot/leg movements. These predicted results of mothers’ behavioural quality of interactions with their infants showed M&M to have a significant effect. Without M&M the Control group mothers’ scores decreased. Similarly (although not significant), the quality of the M&M infants’ behavioural exchanges with their mothers increased over the 5 weeks and those of the Control group decreased. Together, the mother-infant results of *Dyadic Reciprocity* showed a significant increase for the M&M group’s mean score over the 5 weeks and a decrease for the Control group. The M&M program therefore had an impact on the quality of the developing dyadic relationship through the increase of dyadic reciprocity.

### 9.1.2.2 Mothers’ Infant-Directed Speech

Various attributes of mothers’ speech were measured in order to investigate the effect of M&M on the attentional, affective and didactic (linguistic) components of IDS.

In the attentional domain, M&M groups increased mean scores for mean pitch, pitch range and duration of the vowels /i/, /u/ and /a/. The Control group’s mean score results showed a decrease in their mean pitch and pitch range and a minimal decrease in the mean duration of the vowels. The statistical results of mothers’ IDS as a proportional result to their ADS showed significant increases in the M&M group’s mean pitch, pitch range and duration which were predicted. Based on the results of Study 1 that showed M&M increased mothers’ music and enjoyment of interactions with their infants, it was predicted the face-to-face interactions of the mother using speech activities associated with music would positively influence the attentional characteristics of mothers’ speech. The Control group’s proportional results showed minimal change to the pitch, but a decrease in the pitch range and duration. There
results were also predicted based on Study 1’s results – that without M&M mothers’ music and enjoyment of interactions with their infants over the 5 weeks decreased. Hence these results reinforce the role that M&M has on the attentional characteristics of mothers’ speech.

As predicted and similar to the attentional results were those of the intonation elements in the mothers’ IDS, measured by the mean pitch, pitch range and duration of the phrase ‘And these little toes can touch Mummy’s nose’. M&M had an effect on the mean pitch and pitch range with an increase occurring for the M&M group and a decrease for the Control group. Although the results for duration did not reach significance, the M&M group’s mean score showed an increase while that of the Control group showed minimal change over the 5 weeks.

Results from the 5 rating scales of Communicative Intent showed minimal changes for both groups’ rated mean scores for Positive or Negative Affect, Express Affection, Comfort or Soothe and Direct Behaviour. These results did not support the prediction that M&M would have a positive influence on the communicative intention of mothers’ IDS over the 5 weeks. The result of Kitamura and Burnham (2003) were obtained by investigating mothers’ communicative intentions spoken to their infants at birth, 3, 6, 9, and 12 months. It is possible that the duration of the 5-week period was not sufficient to distinguish any perceived changes in the intention of mothers’ IDS as measured by these scales. However, results of Encourage Attention showed a significant decrease over the 5 weeks for the M&M group and a decrease for the Control group despite there being only a 5-week time period between pre- and post-test. This was a surprising result for the M&M group as this scale rates mothers’ vocal tone that engages and maintains infant attention. Given the attentional acoustic characteristics of the M&M group’s IDS increased significantly over the 5 weeks, together with the increase of mothers’ attention to the infant as shown by the Dyad Reciprocity results, it is possible the Encourage Attention results were an effect of the raters’ variability. It is to be concluded, however, that unlike the attentional characteristics and those of intonation, M&M had no effect on the communicative intention of mothers’ IDS during play interactions over the 5-week period.
Regarding the hyperarticulation results, it was predicted that over the 5 weeks mothers’ practice of the M&M activities would not increase the hyperarticulation of their IDS. This prediction was based on the fact that hyperarticulation is a linguistic/didactic function, and that M&M, as an affective communicative medium would not influence this function. Results showed there was minimal change in the areas of the IDS vowel triangles for both the M&M and Control groups over the 5 weeks, supporting the prediction.

It is concluded that over a period of 5 weeks mothers’ practice of the M&M activities enhanced the quality of attentional and intonation characteristics of their IDS when engaging in playing with their infants. Results also confirmed that the M&M intervention does not appear to have an effect on the didactic component of mothers’ IDS.

9.2 Interpretation of Results
The results of Study 1 and Study 2 have shown that the M&M program devised for first-time mothers with their infants 2 to 6 months postpartum positively affected mother-infant interactions. Over and above the factor of face-to-face social contact and mothers’ encouraged use of play through the intervention of the Play and Chat program, it was found that encouraging mothers’ musical interactions have specific communicative outcomes on mother-infant behaviour and the developing dyadic relationship. In the literature review it was proposed that a musical environment created by the mother could promote dyadic well-being and reciprocity (Hatch & Maietta, 1991; Hodges, 1996; M. Papoušek, 1996) (see chapter 4). The results supported this contention. Furthermore, without use of the M&M activities the first-time mothers’ perceived emotional bonding to their infants and mother-infant reciprocity decreased over the 5 weeks. The following provides an interpretation of the results and a model which proposes how M&M as an intervention affects the early development of the mother-infant relationship.

9.2.1 The Effects of Music and Movement on Mother-Infant Interactions
Hodges (1996) argued that music through its elements of rhythm and the modulation of pitch, timbre and dynamics enables the communication of love and affection (see section 4.2). Mothers’ expressiveness when singing to their infants, together with
their ‘musical’ IDS, combined with the coordination of rhythmical movement creates a communicative process that conveys mothers’ pleasure and affection to their infants (Dissanayake, 2000; Trehub & Trainor, 1998). Results of Study 1 showed that M&M mothers reported an increase in the frequency of their interactions that form this communicative process. Furthermore, mothers’ reported increased enjoyment of interactions with their infants was associated with their preferred use of playful up-tempo activities which promoted ‘cheerfulness’ for mother and infant during interactions, as rated by the scale for dyadic reciprocity in Study 2.

As well as the increase in mothers’ use of musical interactions with their infants, M&M had an effect on the attentional and intonation characteristics of mothers’ IDS. The communicative characteristics of maternal singing and speech have been shown to have similar functions. Both types of mothers’ vocal communication with their infants are characterised by heightened pitch, expanded pitch range, and slow tempo which are finely tuned to enhance infants’ attentiveness, and can promote an affective state between mother and infant (Bergeson & Trehub, 2002; Trehub, Trainor & Unyk, 1993). Another aspect to consider is that the higher pitch and slow tempo (resulting in longer duration) in speech are typically associated with happiness and affection (Scherer, 1981) and in IDS the emotion of joy produces a higher pitch and greater pitch range (Trehub & Trainor, 1998). Furthermore, Grieser and Kuhl (1988) argue that mothers’ higher pitch and expanded pitch range of their IDS not only signals positive affect but is coupled with positive interactional gestures.

Based on this literature, interpretations of the results can be made. As an effect of M&M, the increase in mothers’ pitch, pitch range and duration may well have been an important factor that influenced infants’ attentiveness to their mothers’ vocal interactions during play as shown by the Infants’ Reciprocity results of the Mother-Infant/Toddler Play Scale. Furthermore, results of this scale showed the M&M infants increased their cheerfulness and pleasure of interactions during play with their mothers over the 5 weeks. So, compared to the Control group mothers, the increase in the acoustic characteristics of the M&M mothers’ IDS supports the contention that their happiness of interaction with their infant during the play increased over the 5 weeks (also supported by the Mothers’ Reciprocity results of the Mother-Infant/Toddler Play Scale). These may have been important elements in the
rated increase in dyadic reciprocity. The Control group mothers’ dyadic reciprocity results showed a decrease, which meant a decline in these behavioural communicative interactions with their infants over the 5 weeks. Interestingly however, the infants’ results of the Control group showed only a slight decrease over the 5 weeks indicating little decline in their display of attentiveness to their mothers and pleasure and cheerfulness during interactions over this period of time. Perhaps this was indicative of the continued presence of infants’ behaviours indicating need and desire for contact with their mothers that forms and maintains dyadic companionship (Reddy, Hay, Murray & Trevarthen, 1997) (see section 2.2), despite the mothers’ decline in their expressions of pleasure and cheerfulness during play interactions.

The model represented in Figure 9.1 illustrates this interpretation of the results as to how the presence or absence of M&M affected the mother-infant relationship over the 5 weeks.

**A Proposed Model**

**The Communicative Effects of M&M and No M&M on the Mother-Infant Relationship**

- Increases *(Decreases)* mother’s use and enjoyment of playful music and rhythmical movement interactions with her infant
- Increases *(Decreases)* infant’s attention to, and the pleasure gained during interactions with the mother
- Increases *(Decreases)* mother’s pleasure of interactions as conveyed by increases of attentional & intonation qualities of IDS and enhanced quality of behavioural exchanges with her infant
- Increases *(Decreases)* Dyadic Reciprocity

*Figure 9.1 A proposed model of the communicative effects of M&M and No M&M on the mother-infant relationship*
This model shows that through the input of M&M the mother’s use and enjoyment of playful musical activities with her infant increased. From increasing the use of these activities it is proposed that the infant’s and mother’s pleasure of interacting together increased. In addition, the mother’s attentional and intonation qualities of her IDS increased as an influence of the expressive use of M&M which also could have contributed to sustaining the infant’s attention during play. The increase in the sharing of the affective state created between the mother and infant increased mother-infant reciprocity. The absence of M&M in the mother-infant relationship brought about contrary results.

While this model has given an interpretation of the results, it is not clear whether the M&M intervention was a short-term impetus into the developing dyadic relationship and without it, mother-infant reciprocity would then continue to decline (limitations of the research investigation will be discussed in section 9.3). Further discussion continues on the importance of the mother and infant developing their communicative relationship.

9.2.2 M&M and Theories of Mother-Infant Interactions

The theories of Communicative Musicality (Malloch, 1999) and Affect Attunement (Stern, 1985) were presented (see section 2.2) to describe how intimacy during mother-infant exchanges can be created. Both theories describe the dynamic emotional exchanges of the sensitive mother and her infant during face-to-face interactions as being like a dance. The infant gestures to the mother, or vice versa, to partner him/her in a ‘dance’ of expressions that occur in rhythmic sequences, and where the lead role is continually being exchanged from one partner to the other (Stern, 1977; Trevarthen, 1979). Together, the pleasure being experienced by the mother and infant, and the mutuality created during dyadic interactions, builds the companionship of their relationship.

Recent research into affect attunement of mother and infant was discussed in section 2.2.2 (Jonsson & Clinton, 2006; Jonsson et al., 2001). It showed mothers attuned more to infants’ expressions of excitement and happiness, together with their rhythmical movement, than to other types of behaviours, and that the attunement of mother and infant (measured by the intensity, rhythm, shape and duration of the
mother and the infant reactions) continued to increase with infant age from 2 to 12 months. Although the results of this dissertation cannot assume that M&M influenced affect attunement as such, the Mother Reciprocity subscale of the Mother-Infant/Toddler Play Scale did measure mothers’ interactions associated with expressions of cheerfulness and playful gestures and their ‘attuned’ interactions to their infants’ behaviours. M&M mothers increased their reciprocity associated with these behaviours. Without the M&M intervention mothers’ behaviours associated with attuning and cheerfulness and playfulness decreased.

Malloch’s (1999) theory of Communicative Musicality acknowledges the significance of mothers’ singing to their infants as a communicative medium that stimulates dyadic turn-taking. Malloch showed how, when a mother sang a familiar nursery rhyme to her 4 month old infant, the infant could partner the mother by mirroring vocal rhythmic patterns and exchange bodily gestures, which in turn conveyed intention and emotions. It was proposed (see section 2.1.2.1) that Malloch’s results could have been reflective of the infant’s familiarity of the song, and that a song that was not familiar would not stimulate an infant’s turn-taking behaviour as strongly. Familiarity could scaffold infants’ sense of security and competence within their early development. Mothers’ preference for using playful songs and rhymes with their infants could therefore have built on infants’ familiarity of the repertoire enabling them to partner their mothers and enhancing the companionship of the mother and infant, as indicated by the increase in the dyadic reciprocity results.

With regards to the first-time mother in her role as primary caregiver the results of this dissertation are neutral with respect to Papoušek and Papoušek’s (1987, 1995) view that the sensitive mother’s relationship with her infant develops from her ability to parent intuitively, via her intrinsically motivated communicative interactions. The results do however support the proposition that M&M enhances the communicative interaction of first-time mothers with their infants via speech and singing, gestures and rhythmical movement resulting in increased dyadic reciprocity.

Within the developmental period when their healthy infants are beginning to display more responsiveness and a greater desire to partner their mothers in communicative
interactions, it was shown that unless provided with the M&M resources to stimulate these interactions, first-time mothers’ frequency and enjoyment of M&M communicative interactions decreased, together with the reciprocity of the developing mother-infant relationship. While not denying intuitiveness influences mothers’ communicative interactions with their infants, the results of Studies 1 and 2 suggest that healthy mothers and their infants benefit from the input of music and movement activities that enable them to create the environment that enhances dyadic interactions. Moreover, if first-time mothers’ use of music and movement activities with their infants was already part of their intuitive parenting as argued by Trehub (2002) (and discussed in 6.4) it needs to be questioned as to why, without M&M as an intervention did mothers’ music and movement interactions with their infants decrease over the 5-week period and those with M&M increase.

Perhaps the quality of mothers’ musical interactions with their infants as part of intuitive parenting is dependent on various factors. It is possible that in our culture, mothers’ practice of music and movement activities with their infants is not recognised as being an important part of mothers’ daily caregiving routine and therefore parenting programs and parenting books do not guide new parents towards the inclusion of these activities. This paucity of advocating for the use of music and movement could also be contributing to mothers’ lack of repertoire to engage their infants. As Vlismas and Bowes (1999) found, middle-class first-time mothers had a limited repertoire of music and movement activities they practiced with their infants. Another consideration is that the current generation of first-time mothers may have little memory of being sung to in their own childhood. The intergenerational transmission of families sharing music within the home environment has been shown to contribute to parents providing a musically rich environment for their own infants. Custodero and Johnson-Green (2003) showed that parents who remembered being sung to in their childhood were more likely to provide a musical home environment for their own infants than parents without such memories. Thus, a shrinking repertoire of music and movement activities may have begun with the previous generation.

Considering these factors, intuitiveness as such may be an underlying part of parenting skills, but parents’ musical intuitiveness may need to be ‘unleashed’ by
way of encouragement and availability of repertoire. Through the supportive encouragement of parenting programs and other resources (such as books, CDs and DVDs) first-time parents could be empowered to create a musical environment to nurture their developing infants. In addition, and based on the findings Custodero and Johnson-Green (2003), if parents’ practice of musical interactions are sustained and become part of families’ nurturing home environments during the early childhood years, it is likely that this practice will form part of their children’s valuable memories which they, in turn, will then practice as parents. The repetition of such parenting practices may also affect parenting self-efficacy. Leerkes and Crockenberg (2002) found that the self-efficacy of first-time mothers was influenced by the memories of their own parenting experiences, particularly those provided by their mothers. So the positive memories of mothers sharing music activities with their children could well affect the self-efficacy of these children in their future role as parents. From the evidence of Vlismas & Bowes (1999), it appears that a downward spiral has begun in Australian society around maternal use of music and movement activities. Through a simple program, such as presented in this thesis, it may be possible to reverse this trend in the current and then in future generations.

While self-efficacy was not directly measured in this thesis, there is evidence that self-efficacy was positively influenced. Literature on maternal self-efficacy notes that mothers who feel efficacious in their parenting role are more responsive, empathetic, less punitive and more appropriate in their developmental expectations of their infants (Bornstein, 2002). Other literature presented on the theory of maternal self-efficacy (Bandura, 1977) (see section 1.3.1) indicates that the success of repeated performance accomplishments with their infants and vicarious experiences (through the influence of live modelling) can positively affect mothers’ competence in their role as caregiver. It is unlikely that the vicarious experiences associated with the live modelling techniques used in the M&M-F2F method was of influence because the presence of F2F contact showed no positive effect on mothers’ interactions with their infants. However, the M&M mothers could have experienced a greater sense of accomplishment from their performance using M&M activities with their infants. An indication of this was the Quality of Attachment results.
The subscale of *Quality of Attachment* in the Maternal Post-natal Attachment Scale measured mothers’ emotions for their infants and competence in the role as mother. Results of both studies showed the M&M mothers increased their *Quality of Attachment* and the Control groups’ decreased. Teti et al., (1996) noted that mothers’ perceived competence influences their motivation to engage their infants, which leads to more frequent opportunities for interaction with their infants resulting in a better understanding of their infants’ needs for a positive caregiving environment. M&M was shown to increase the frequency of mothers’ music and enjoyment of interactions with their infants. Results of the *Pleasure of Interactions* subscale of the Maternal Post-natal Attachment Scale which showed an increase for the M&M mothers in both studies were reflective of this. Therefore the M&M program may have provided mothers with resources that motivated their desire to interact with their infants. Infants’ responsive, positive reactions to the mothers could have enhanced mothers’ feelings of task success. As Bornstein (2002) noted, the more rewarding the interaction between mother and infant, the more motivated the mother becomes to seek further quality interactions. In particular mothers showed a preference for the playful repertoire in the M&M activities. Mothers reported that these activities produced laughter with their infants and exchanges of fun between mother and infant. As a result of the pleasurable exchanges, feelings of maternal competence may well have been enhanced.

While the M&M program was influential on mothers’ interactions with their infants, questions need to be addressed as to how these interactions could affect infants’ development.

### 9.2.2.1 The Presence and Absence of M&M on Infant Development.

It was discussed in section 2.1.2 that from 3 months of age infants’ intrinsic motivation for social interaction and playfulness stimulates their desire to partner the mother in games (Trevarthen, 1993, 2001). By 6 months, infants’ repertoire of behaviours has developed to displaying their social competence through engaging those familiar to them (M. Papoušek, 1996; Trevarthen, 2001). As social and communicative beings, infants need companionship and the intimacy of their mothers’ interactions for the development of a repertoire of social behaviours (Reddy, Hay, Murray & Trevarthen, 1997; Trevarthen, 2001). As indicated by the
results the presence of M&M could have influenced the development of such behaviours affecting infants’ social and emotional well-being (supported by data such as the results of Dyadic Reciprocity).

Interestingly however, Study 1’s results of mothers’ play interactions, which included the variables of talking, relaxing and playing, showed that with the exception of the M&M-Only group, mothers decreased their play interactions with their infants. Although it is uncertain if this measure would continue to decline further over time, the question needs to be raised about what effects this might have on infants’ development in the second half of their first year. This decrease could indicate that mothers may be spending less time interacting playfully with their infants as they develop and are using other sources of stimulation they consider appropriate for their infants’ development such as television (see section 6.1.2.) as a form of entertainment within the home. What these results could also reflect is the developing parenting style of these educated, middle class mothers. If these mothers lack motivation and resourcefulness to want to create an environment that stimulates dyadic interactions they may be taking an ‘easy option’ to entertain their infants via the use of television.

Regarding the effects of the M&M program on infants’ development, it is uncertain whether the mothers’ communicative interactions using M&M within a timeframe of 5 weeks in the first six month postpartum would influence infants’ development in the second half of the first year and beyond into the second year of development. What is encouraging from the research of this dissertation however is that mothers’ participation in the M&M program increased their communicative interactions using musical activities with their infants. As a result mothers’ quality of attachment, pleasure of interactions together with dyadic reciprocity increased. Other research has implied the importance of mothers’ quality of interactions in the early postpartum months to the later development of the infant. Feldman and Greenbaum (1997) found that mothers’ display of maternal affective sensitivity, synchrony and affect attunement during face-to-face play with their infants at 3 months influenced their development of symbolic play and internal state talk at 2 years of age. If this is so, mothers engaging their infants using M&M activities in the early postpartum months which have been shown to benefit the quality of the dyadic interactions could
well affect the infants’ later cognitive and language development. Such findings could only be determined in follow-up studies.

Uncertainty remains as to whether mothers would continue to include M&M activities with their infants without encouragement of being a program participant.

### 9.3. Limitations of the Studies and Implications for Further Research

The two studies have certain limitations. Firstly, the results can only be representative of the effects of M&M on healthy first-time mothers who were educated, middle class and supported socially. Furthermore, the infants were healthy and were not perceived by their mothers as being difficult. Results could well have differed if mothers were experiencing the effects of stress factors such as infants’ temperament being difficult, the lack of social support or post-natal depression. Further investigations could provide evidence on the effects of M&M as an intervention with such mothers and their infants under the age of 6 months. It is possible that the intervention of M&M with mothers suffering from post-natal depression could encourage their music and enjoyment of interactions together with rhythmical movement. These interactions could in effect enhance mothers attentional and intonation characteristics of their IDS, stimulate infant responsiveness and dyadic reciprocity, and overall positively affect the course of their depression.

Further research could also investigate the effects of M&M on maternal self-efficacy. While the subscale of *Quality of Attachment* in the Maternal Post-Natal Attachment Scale measured mothers’ emotions for their infants and competence in the role as a mother, a specific scale that measures maternal self-efficacy could have added knowledge to the effects that M&M has on maternal well-being and mothers’ early developing relationship with their infants.

Another limitation to be recognised is that although Study 2 showed that M&M increased the attentional and intonation characteristics of mothers’ IDS and increased dyadic reciprocity, these results should only be viewed as being relevant to the M&M-Self Instruction method. Study 1 showed that the M&M-Self Instruction method was more effective overall in enhancing mothers’ interactions with their
infants than the method used in the M&M-F2F group, and thus Study 2 used only the self-instruction method. Although it was proposed that the increase in mothers’ enjoyment and use of music and movement interactions was likely to have enhanced the acoustic characteristics of mothers’ IDS and dyadic reciprocity regardless of instruction method, it is actually unknown if the M&M-F2F method would have been equal to, less or more effective than the M&M-SI method in obtaining such results.

While first-time mothers as the primary caregivers were studied because of the challenges the transition to parenthood presents in the early post-partum period, research was presented showing that fathers as equal partners in their new family system also go through a transition process. M&M could be investigated not as an exclusive intervention to be practiced only by first-time mothers with their infants but as a practice that includes the fathers.

Beyond these limitations it has been discussed that it is unknown as to whether the effect of M&M in the first 6 months of the infant’s life would continue to affect the mother-infant relationship in the second 6 months and what effects this intervention could have on infants’ development at the end of their first year. A follow up study could investigate such effects. It could also be of interest as a further follow-up study to develop an M&M program appropriate for infant and parent participation in the second half of this first year to assess its influence on both infants’ development and the dyadic relationship.

Thus, further research could add to the knowledge on the effects of M&M on mothers’ well-being, infant development and the dyadic relationship as the infant grows into a toddler.

### 9.4. Conclusions

The studies of this dissertation were devised with the intention to elucidate the role that music and movement plays in the developing relationship of first-time mothers with their infants. It can be concluded that the M&M program was an effective intervention in the early postpartum months that enhanced the first-time mothers and their infants developing relationship. Importantly it was shown that M&M influenced mothers’ perceived attachment to their infants, specific communicative qualities as
measured in mothers’ IDS characteristics and the reciprocity of dyadic behavioural interactions. Music and movement activities that promote playful dyadic interactions appeared to have been particularly valued by mothers to include in their repertoire of activities they practiced with their infants under the age of 6 months. As a result of not having the stimulus of the M&M activities, concerningly the mothers decreased their music and rhythmical movement interactions. Further negative repercussions from the lack of M&M were found with the decrease in mothers’ perceived maternal attachment, IDS characteristic and their dyadic reciprocity over the 5 weeks.

Clearly, the results of this dissertation, together with previous research (Vlismas & Bowes, 1999) illustrate the simplicity and effectiveness of mothers being encouraged to use music and rhythmical movement activities with their young infants. What is unclear is whether the tradition of mothers’ use of music with their infants is in decline and if so to what extent. Mechthild Papoušek (1996) expressed concern for the decline of mothers’ use of singing and dancing with their infants and thought it was part of lifestyle changes and the over-use of background music for entertainment. If families’ efforts to purposefully interact with their infants and young children using songs, rhymes and rhythmical movement are in decline as a tradition, this means that a source of communicating love and affection is also in decline. Importantly, Trainor and Heinmiller (1998) argued that because emotional communication is crucial to survival, humans have evolved to understand the messages conveyed in the musical element of speech and singing. If these musical interactions are happening less often, then we as humans will be deprived of a fundamental source of affective communication.

Furthermore, and fundamental to the inability of some parents to provide their infants with musical interactions throughout the caregiving day is the amount of time that is spent in the home environment. Many infants from a young age spend more time during their day within childcare settings than they do within their homes which could be exacerbating the possible demise of these infants having one-on-one musical interactions. Based on anecdotal evidence gathered by the researcher who has been involved in early childhood education for over 25 years, it appears that both planned and spontaneous musical interactions between carers and children are becoming a forgotten part of early childhood care and education. From the
researcher’s experience in providing in-service music education workshops for early childhood teachers and childcare workers many lack the confidence to to carry out music and movement activities with infants, toddlers and pre-school aged children. Lack of repertoire could certainly be a variable affecting their confidence. As a result it is easier for them to turn on a CD (such as the ‘Wiggles’) and leave the children to sing along. It seems also to have become common practice for the radio to be left on in the childcare rooms and outdoors for most of the day and have pop music playing in the background. There was discussion in section 4.6 concerning the use of recorded music within the caregiving environment, suggesting that such music cannot sufficiently support the development of musicality (Hanuš Papoušek, 1996) and that it is no substitute for a primary caregiver’s ‘live’ performance (Trehub & Trainor, 1998). Such practices could have repercussions on children’s development.

As a source of stimulating early musicality Papoušek and Papoušek (1987) advocated that infants’ exposure to reproduced music could not provide them with the sensitivity and pleasurable feedback cues of the caregivers’ face-to-face musical interactions. Without such musical interactions the caregiving environment can suffer a deficit of playfulness and creativity that stimulates the children’s emotional and cognitive growth (Papoušek & Papoušek, 1987).

What these practices reflect is a combination of influencing variables. Perhaps one of the primary reasons why there seems to be a lack of inclusion of music education in the early childhood setting is the training of the childcare workers and teachers. Over the past 10 years, the course contents relating to music education in the training institutes of TAFE (Technical and Further Education) for childcare workers and leading universities for early childhood teachers in the Australian states of New South Wales and Queensland (in which the researcher has had professional work experience) appear to have been in gradual decline. If children are to be nurtured musically from birth through to their school years there needs to be greater advocating to parents and early childhood carers and educators that enjoying the sharing of music and movement activities is an important aspect of affective and interpersonal development. Not only could the children benefit developmentally from the inclusion of a musical environment but the adults’ feelings of success in providing this environment and sharing the joy may also be of benefit – in particular, for their feeling of self-efficacy.
To ensure that shared music and rhythmical movement activities are a source of enjoyment and have potential developmental benefits to the mother, father and infant in the early post-partum months, appropriate education and resources which could be provided through parenting programs, CDs and DVDs need to be much more widely available. From this early encouraged practice, it is hoped that parents would continue to explore the use of music and movement with their developing infants. Together, the sharing of such activities could create a musically enriched environment that promotes companionship and regenerates musical practice as part of a developing family’s tradition – a tradition to be passed on to subsequent generations.
CHAPTER 10

References


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APPENDICES
APPENDIX 1

THE MUSIC AND MOVEMENT PROGRAM
**TOPIC 1 Relaxation and Dance with Your Infant**

This topic consisted of 3 components
- Establishing relaxation methods using music
- Using touch and facial expressions to stimulate your baby
- Developing rhythmic movement to music

The starting point for mothers’ participation in the program was to present information about the need to establish a relaxation routine with their infants for the well-being of their relationship. Relaxation methods vary but listening to music is one form that can create calm.

To establish an overall calm ambience, *Gabriel's Oboe* (by Ennio Morricone, 1986. *The Mission*, Original Sound Track) was chosen because of the slow tempo and the legato quality of the oboe playing. Mothers were encouraged to position themselves next to their infant in a comfortable position such as to lie on soft flooring and to use touch with their infant, either through the stroking of the forehead or massaging the infants’ feet in a circular motion. Maximising on face-to-face contact with their infant was also encouraged. The music provided a pulse that mothers could use to establish a rhythmical pattern using touch. Extending the use of touch, massage techniques that incorporated positive vocal and facial gesturing were demonstrated by the researcher that might assist in soothing and relaxing the infant. Another example of music suitable for this type of relaxation was *On wings of song* by Mendelssohn (Dan Gibson, 1991. *Solitudes: Exploring Nature with Music. The Classics*. Holborne Distribution) because of the rhythmic sound produced by the sound of the ocean mixed in this recording.

Movement was also introduced as a form of relaxation. Continuing with the notion that music provides a pulse within which rhythmic body movement patterns can be formed, cradling their infants and swaying and rocking with them may release mothers’ body tension as well as relaxing the infants. The song *Hold me in your arms* (Southern Sons, 1998. *Pillow Talk: The rhythm of love*. BMG Aust.) was appropriate for this activity because of the suggestive lyrics. The instrumental piece
She Never Knew (Tommy Emmanuel, 1995. From Tommy Emmanuel & the Australian Philharmonic Orchestra. Sony Music Productions) was included to inspire mothers to dance with their infants. The slow waltz time of this piece included crescendos that led to pauses in the tempo, creating moments where the mother could vary the movement with her infant. The combination of these elements allowed for anticipation and excitement to occur between the mother and infant as their dance became more expressive. Presenting variation in styles of music suitable for relaxation was important as some mothers may not have had the opportunity to listen to diverse pieces of music, and consequently engage with their infant using different music.

**TOPIC 2 Introducing Rhymes and Songs**

This topic consisted of 2 components
- Singing nursery rhymes and lullabies
- Exploring further with movement and relaxation

Singing and incorporating rhythmic movement, touch and multimodal gesturing was introduced to the mothers using nursery rhymes. The traditional nursery rhymes of Baa Baa Black Sheep and Twinkle Twinkle Little Star were included because they may have been familiar to the mothers and part of their practised repertoire of activities with the infant prior to commencement of the program. Importantly for the purpose of the program, emphasis on expression of facial and body gesturing could be easily incorporated into these rhymes through mothers’ smiling and gesturing on the positive words of ‘Yes Sir Yes Sir’ and the show of hand/fingers for the twinkling stars to engage and retain infant attention. Mothers were also encouraged to play with their infants rhythmically, using the infants’ hands and feet to tap together and gently roll their bodies from side to side.

The nursery rhyme medley (Australian Broadcasting Corporation, 1994. Oomba Braoomba. EMI.) presented a variation of the traditional rhymes using up-beat tempo that could evoke fun between mother and infant though improvised dance. Again, the words of these songs may have been familiar to the mothers easing them into
combining singing with dance. Mothers held infants comfortably and at all times were encouraged to maintain face-to-face contact with their infant when dancing and singing. This was important for both mothers and infants in the exchange of facial gestures. The drumming piece, *A Medley* (Artist, Brent Lewis, 1997. *Rhythm Basket*. Brent Lewis Productions) provided another opportunity for fun using dance improvisation with dance to the familiarity of the nursery rhyme rhythms. Also it was explained to the mothers that infants need to feel confident with the mothers’ dance actions in order for them to feel safe and ultimately secure throughout the movement interactions.

In contrast to the up-beat tempo for movement and singing was the introduction of lullabies. The lullaby, *Gonna Rest Now* was lyrically suggestive of sleep, so singing to the infant in a soothing, calm tone of voice was encouraged through slowing down the tempo and sustaining the last word of each verse. The singing could accompany cradling the infant and rocking or swaying or using touch such as stroking. The instrumental pieces *Brahms Lullaby* (Artist, Roger Woodward, 1997. *Roger Woodward: Lullabies*. Artworks Productions) and *Wiegenlied* (Adelaide Symphony Orchestra, 1995. *Dream Children*. Australian Broadcasting Corporation, EMI.) were included to provide variation and choice so mothers could develop a repertoire that they found enjoyable when interacting with their infant.

**TOPIC 3 Clapping, tickling and knee jogging rhymes**

Four components were included in this topic
- Exploring ‘the beat’ and vocal expression
- Tickly rhymes, touch and facial expressions
- Fun through movement - knee jogging rhymes and songs
- Improvisation and rhymes

The words of the rhymes were suggestive of playfulness. Mothers were encouraged to accentuate their use of vocal prosody in a playful manner when reciting the rhymes and interacting with their infants. The accentuation of vocal pitch using rising and falling contours was matched with mothers’ use of movement with their
infants where appropriate. The pulse presented a sense of predictability of the phrasing as mothers synchronised vocal recitation with touch/movement interactions.

In particular, when mothers recited the rhymes *Shoe a little horse* and *Pat-a-cake* the infants hands or feet could be gently tapped together, attuning the infants sensation of pulse to the mothers vocal expression. Accentuating vocal pitch and prosody and changing tempo by pausing on words to build excitement and anticipation for the infant were techniques used to stimulate and retain infants’ attention as part of facilitating positive dyadic turn-taking. These elements, together with facial gesturing and mothers use of touch/tickling with their infant were predominant in the recitations of *Pizza Pizza, Round and round the garden* and *Slowly, Slowly* and *This Little Piggy*.

The knee-jogging rhymes *Bouncy Bouncy, Blinckety Blonk* and *To Market* presented a slight variation to the above rhymes, with the words suggesting more movement/up tempo activity. The mother could vary the tempo and rhythmical movement by either jigging the infant on her knee or increasing to trotting with her baby around the floor space. In addition, mothers could accentuate a trotting rhythm by including a sound maker such as a rattle or hand bells to *Ride a cock horse*. Slowing the tempo on the last verse of these rhymes accentuated change in the energy and emotion released by the mother, bringing a sense of conclusion to the activity.

Improvisation was also encouraged as it enabled mothers to adapt the activities to suit the moment and to explore their creativity with their infants. Using tongue clicking to create a ‘clip clop’ sound could be added to the knee jogging activity. Composing fun rhymes relating to daily care routines can be part of building a repertoire of activities that mother and infant enjoy and promote positive dyadic interactions.

**Topic 4 Musical Games to Play with Your Baby**

This topic was created around the everyday happenings that are part of mother-infant relationship such as feeding and bathing and to introduce stimuli that may inspire vitality to these caregiving routines. The topic components were:
• Toys as musical instruments
• Peek-a-boo games
• Songs for everyday happenings

The selection of songs represented some daily aspects of the care routine, the home and outdoor environment, and were appropriate for including various types of stimuli that gave mothers the opportunity to extend their repertoires.

As an introduction, the song *Little Baby* (Australian Broadcasting Corporation 1994. From *Oomba baroomba*, EMI) was included for its up-beat tempo, and the words were suggestive of fun and play between mother and baby. Sound making toys such as rattles were offered to mothers to shake to accentuate pulse and rhythm when dancing or sitting with their infant in their lap, or bouncing the infant while singing. Depending on the infants’ motor development, and the suitability of the toy for infant hand grasping, it was suggested mothers could vary the activity by offering the infant the toy to grasp and mothers assisting by holding the infant’s hand and gently shaking the rattle together to accompany the song.

*Wiggle your toes in the sun* (Australian Broadcasting Corporation, 1987. From *There’s a bear in there*, EMI) and *Bend with the wind* (Australian Broadcasting Corporation, 1981. From *Humpty dumpty*, CBS Records) were included because the lyrics were reflective of the outdoor environment that influences the lifestyle of people living in Queensland, Australia, where this study took place. The rustling of leaves and the movement of the shadows caused by the breeze (something that mothers and their babies often encounter when in the outdoors) produces aural and visual stimulation for the infant. This stimulation, combined with the mother singing songs, creates a relaxed atmosphere for pleasurable interactions. The infants can be positioned on a rug in the shade of the trees while the mothers sing and massage their feet to *Wiggle your toes in the sun*. For the song *Bend with the wind*, it was suggested that mothers could introduce the use of a silk-like scarf as a visual stimulus, positioning it above the infant and using a sway like motion as suggested by the rhythm and lyrics of the song as they sing.
The use of the scarf could be transferred to peek-a-boo musical games. Infant responsiveness to the mother’s actions with this type of activity may be developmentally dependent. Infants may initially be startled, so mothers’ interactions of this type needed to be gradual, building infants’ confidence as a partner in the game, and for the experience to be gradually built on through repetition. The see-through fabric of the scarf allowed the infant to always be in sight of their mother so as to maintain the infant’s sense of security. To initiate the interaction, it was suggested mothers place the scarves over their own heads and use the words *Ah…Boo*, releasing the scarves on *Boo*. The word *Ah* facilitated a rise in mothers’ vocal pitch which reached its highest point on the start of *Boo*, then falling back to the starting note.

The intensity of the vocal rise and then the fall is indicative of pleasure for the infant (Stern, 2000). Once mothers had successfully introduced this activity to the infant, it was suggested that they transfer the scarves to the infants face as a new sensory stimulus and progress to incorporating the singing of the program’s Peek-a-boo songs (See Section 4, Appendix 1 and 2). These 2 songs were composed by the researcher to include the words *Ah…Boo*.

*Rain is falling down* (Australian Broadcasting Corporation, 1981. From *Humpty dumpty*. CBS Records) was representative of another interactive experience where mothers could sing to the infant during a rainy day by looking out the window, and tapping the glass to the lyrics of ‘pit-a-patter pit-a-patter’. Or the mother could sit with her infant and use touch to suggest the ‘pit-a-patter’ of the rain.

*Bathtime* (Australian Broadcasting Corporation, 1981. From *Humpty dumpty*. CBS Records), *Splish Splash Splosh* (Australian Broadcasting Corporation, 1991. *It’s playschool*. EMI) and *All the fish* (Australian Broadcasting Corporation, 1991. *It’s playschool*. EMI) were included because the daily bathing routine can be a fun, relaxed time shared by mother and infant. For many young infants the water provides a calm, soothing environment, and as they develop, their motor skills are a means for them to explore their surroundings, and splashing water with their feet and...
hands can be a pulse-like motion. Mothers could accompany the infants’ actions by singing the songs and incorporating play with the bath toys, such as fish.

_Singing in the kitchen_ (Australian Broadcasting Corporation, 1994. From _Oomba baroomba_. EMI) is an up-tempo song suggestive of rhythmic play through the lyrics ‘banging on the pots and pans’. As the infant develops and is able to sit by being supported, or by self supporting, the rhythmic sounds that can be created by the banging action of the infant using a spoon on an old metal saucepan creates great delight for the infant. As part of mother-infant play time such an activity is conducive to interactive fun through song and sound making. This activity could also be transferred to mealtime with the infant banging the spoon on their high-chair tray table while mother sings and feeds the infant. Such activities are dependent on infants’ motor development, so mothers needed to be sensitive as to whether this activity was appropriate for the infant’s stage of development. To be more inclusive for younger infants this song could also inspire mothers to dance with their infants…in the kitchen.

_Sing a Rainbow_ (Australian Broadcasting Corporation, 1991. _It’s playschool_. EMI.) was representative of a traditional song that could be sung to evoke a calm mood. It could be included as a ‘wind down’ song after an active play session, indicating to the infant a change in the level of stimulation to the relaxation of being held in the mother’s arms and swayed to accompany the singing.

**TOPIC 5 Evoking mood using music and movement**

The components to this topic were:

- Using music to evoke different moods
- Lets dance
- Lets relax

The mixed genres of music provided mothers with the opportunity to use the musical selections to evoke different moods and enhance pleasurable interactions with their infants using movement. Various movement styles could be explored to not only include dance that was representative of the tempos and pulse of the music but also to discover the joy of experiencing motion through spatial movement as mother and
infant move around the room using actions such as bending/dipping, lifting up and down and turning/swirling. The harmonious flow of movements may transfer feelings from one partner to the other, producing mutual enjoyment.

An important instruction was for mothers to be keen observers of their infants’ reactions to the movements. For the mother to successfully engage with the infant through movement she needed to be observant of infant’s cues and reactions and adjust her style accordingly. It was emphasised to the mothers that their infants’ needed to feel safe and secure throughout the movement interactions.

*Up Above My Head* (by Vika and Linda, 1994. *Vika and Linda*. Mushroom Records) was included because of the dynamic intensity created by the rock and roll style. The instrumentation and style of singing combined to present an up-lifting, energetic mood. There was little variation in tempo and dynamics which sustained the energetic feeling and presented predictability for mothers to use as a dance piece with their infants. Mothers positioning of the infants during the dance would depend on the infants’ development. If the infants were self-supporting, mothers could dance while holding them on their hip, providing their infants with the freedom to explore the space around them. Infants’ sense of security would be maintained through the mothers’ holding position. Younger infants could be cradled more securely with mothers interacting through a slower rocking movement. Regardless of the movement style, rhythmical dialogue would be present between mothers and infants.

The Irish composition *Ferny Hill* (The Chieftains, 1995. *The Long Black Veil*. BMG Music) was of quick tempo and the timbral effect of combining violins and flute promoted a lively atmosphere for mother and infant to enjoy dancing. Similar to *Up Above My Head*, *Ferny Hill* presented little variation in dynamics and tempo, which could assist mothers in maintaining a predicable flow of the spatial movements in order to support the infants’ sense of security. *The Tennessee Waltz*, (Artist, Tom Jones. From The Chieftains, 1995. *The Long Black Veil*. BMG Music.) could be used to create calm between mother and infant through the slow? 3/4 time. The pulse enables a direction change to occur through the transference of weight from one side of the body to the other as the mother dances, creating a swaying motion that synchronises mother and infant movements.
Have I Told You Lately That I Love You (by Van Morrison, 1998. *The Best of Van Morrison*. Exile Productions) is a simple vocal piece that may have roused mothers’ emotions of love and connections with their infant. Gently rocking to the 4/4 time, the mother could cradle the infant, providing a relaxed body for the infant to nestle and share. The movement may be combined with the mothers’ singing of the lyrics.

Sanctus (From Requiem, Op. 48 by Fauré. From Faure Requiem *Kings College Choir, Cambridge*. 1998. EMI Records) is a choral piece that may have been unfamiliar to the mothers, and its inclusion may have provided encouragement to extend their repertoire if they enjoyed it. The timbral qualities of combining orchestra and voice could evoke feelings of tranquillity between mother and infant, and this feeling could transfer to movement. The sustaining of the musical notes that occurs throughout the singing of the piece could suggest long flowing tranquil movements as the mother and infant dance. Moments of climax occur toward the conclusion of the piece through orchestral and vocal crescendos which could inspire surges of energy from the mother-infant dancers, which then gradually decreases in the final moments as the decrescendos bring the dance partnership to a relaxed conclusion.

*Fauré Lullaby* (performed by Roger Woodward, 1997. *Roger Woodward: Lullabies*. Artworks Productions) was presented as a variation to the repertoire of song lullabies in Topic 2. With the mother holding the infant, and using a swaying motion as suggested by the pulse, a relaxed atmosphere could be achieved. There are momentary surges of acceleration in the tempo, which produce a sense of climax to the build up of energy in the dance, and then this energy gradually releases as the tempo slows and the dynamic fades, as the piece comes to a finale, signalling to mother and infant a conclusion to their dance.
APPENDIX 2

‘MUSIC CD 1’ AND PROGRAM GUIDE FOR M&M-F2F PARTICIPANTS
Mother and Infant Activities Program

Outline of Topics

Topic 1  Relaxation and dance with your infant

- Establishing relaxation methods using music
- Using touch and facial expressions to stimulate your baby
- Developing rhythmic movement to music

Topic 2  Introducing rhymes and songs

- Singing nursery rhymes and lullabies
- Exploring further with movement and relaxation

Topic 3  Clapping, Tickling and Knee Jogging

- Exploring ‘the beat’ and vocal expression
- Tickly rhymes, touch and facial expressions
- Fun through movement - knee jogging rhymes and songs
- Improvisation and rhymes

Topic 4  Musical games to play with your baby

- Toys as musical instruments
- Peek-a-boo games
- Songs for everyday happenings

Topic 5  Evoking mood using music and movement

- Using music to evoke different moods
- Lets dance
- Lets relax
APPENDICES

Content of ‘Music CD1’ for the M&M-F2F group

**Topic 1  Relaxation and dance with your infant**

**Track**

**Topic 2  Introducing rhymes and songs**

**Topic 3  Clapping, Tickling and Knee Jogging**
13. *Shoe a little horse*  (Traditional)  (Voice of Wendy Vlismas)
14. *Pat-a-cake*  (Traditional)  (Voice of Wendy Vlismas)
15. *Round and round the garden* From Gary and Carol Crees (1999), *Music, Movement and Dance*. Open Learning Institute of TAFE. Queensland
17. *Slowly, Slowly*  (Traditional)  (Voice of Wendy Vlismas)
## Topic 3  Clapping, Tickling and Knee Jogging (con’t)

### Track

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<th>Title</th>
<th>Source</th>
<th>Performance</th>
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<tr>
<td>18</td>
<td><em>This little piggy</em> (Traditional)</td>
<td>(Voice of Wendy Vlismas)</td>
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</tr>
<tr>
<td>21</td>
<td><em>To Market, To Market</em></td>
<td>From Gary and Carol Crees (1999), <em>Music, Movement and Dance.</em> Open Learning Institute of TAFE. Queensland</td>
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<tr>
<td>22</td>
<td><em>Gregory Griggs</em></td>
<td>From Gary and Carol Crees (1999), <em>Music, Movement and Dance.</em> Open Learning Institute of TAFE. Queensland</td>
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## Topic 4  Games to play with your baby

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<tr>
<td>31</td>
<td><em>All the fish</em></td>
<td>From Australian Broadcasting Corporation, (1991). <em>It’s Playschool.</em> EMI</td>
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## Topic 5  Evoking moods using music and movement

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<tr>
<td>34</td>
<td><em>Up Above My Head.</em></td>
<td>From Vika and Linda (1994). <em>Vika and Linda.</em> Mushroom Records</td>
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</table>
Topic 5 Evoking moods using music and movement (con’t)

Track


M&M-F2F Weekly Session Guides

**TOPIC 2 – Session 2**

Introducing Rhymes and Songs

**Warm-up**

*Nursery rhyme medley: Baa baa black sheep, Hey diddle diddle, Twinkle twinkle little star, Little Miss Muffet Frere Jacques.*

*Drumming medley of nursery rhymes – for dancing*

**Lullabies and Songs to Soothe**

*Gonna Rest Now*

Gonna rest now,
Gonna rest now,
My head is heavy
So I’m gonna rest now

*Braths Lullaby*

Go to sleep
Now in peace,
My own little baby, (Insert your baby’s name)
You’re a tired little thing,
So- sleep while I sing.

When the bird,
Leaves it nest,
You will wake from your rest,
When the bird leaves its nest,
You will wake from your rest.

*Rock a bye baby in the tree top,*

When the wind blows the cradle will rock,
When the bough breaks the cradle will fall,
And down will come baby cradle and all.

*Twinkle Twinkle Little Star*

How I wonder what you are,
Up above the world so high, Like a diamond in the sky,
Twinkle Twinkle little star, How I wonder what you are.

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1 No Song/Rhyme lyrics were provided for the Sessions 1 and 5
TOPIC 3 – Session 3

Clapping, Tickling and Knee Jogging

Clapping and Tickling Rhymes

Shoe a little horse,
Shoe a little mare,
But let the little colt go bare, bare, bare

Pizza, Pizza pum-per-nickle
This little girl/boy deserves a tickle
One for her/his nose…. And one for her/his toes….And one for her/his tummy
Where the peanut butter goes.

Round and round the garden,
Went the Teddy Bear,
1 step, 2 steps and …..tickle him/her under there.
Round and round the garden,
Like a little mouse
1 step, 2 steps…in her little house
Round and round the garden,
Like a pussy cat
1 step, 2 steps…tickle her there like that

Pat-a-cake,
Pat-a-cake,
Baker’s man.
Bake me a cake,
As fast as you can.
Pat it and prick it,
And mark it with B,
And put in the oven for baby and me.

Slowly, slowly, very slowly,
Up the wooden rail,
Slowly, slowly very slowly,
Goes the garden snail.
Quickly, quickly, very quickly,
Round the little house,
Quickly, quickly very quickly,
Goes the little mouse.

This little piggy went to mar-ket,
This little piggy stayed at home,
This little piggy had roast beef,
And this little piggy had none,
And this little piggy went…..
Wee wee wee wee all the way home.

Knee Jogging and Trotting

Bouncy Bouncey up and down
Bouncing all the way to town
Bouncing up and bouncing down,
Bouncing all the way to town.
**Blinkety blonk, Blinkety blonk**
Horses gallop and horses romp
Blinkety blonk, Blinkety blonk
Gallop and gallop and gallop and…PLONK!

**To market to market to buy a fat pig**
Home again, Home again *jiggety* jig,
To market to market to buy a fat hog…
Home again, Home again *jiggety* jog,
To market to market to buy an old hen
Home again, Home again *rickety* ren,
To market to market to buy a young chick,
Home again, Home again *rickety* rick,
To market to market to buy a peach pie
Home again, Home again baby and I.

**Gregory Griggs, Gregory Griggs**
Had twenty seven different wigs
He wore them up…..
He wore them down……
To please the people of the town.
TOPIC 4 – Session 4

Games to play with your baby

**Peek-a-boo**
Who is hiding there, Who is hiding there?
It's .... *(Put your baby’s name here)*  It’s ..... 
That’s who’s hiding there

**Songs for everyday happenings**

*Wiggle your toes in the sun,*
Lazy and warm, lazy and warm
Wiggle you toes in the sun

*Red and yellow and pink and green* 
Purple and orange and blue,
I can sing a rainbow, sing a rainbow,
Sing a rainbow too.
Listen with your eyes,
Listen with your eyes,
And sing everything you see,
I can sing a rainbow,
sing a rainbow,
Sing a rainbow too,
Red and yellow and pink and green
Purple and orange and blue,
Now we can sing a rainbow,
Sing a rainbow,
Sing a rainbow too.

*All the fish are swimming in the water, swimming in the water*
All the fish are swimming in the water,
Fol-de, rol-de-rol-de-ray.

*Splish, Splash, Splosh*
I’m having a wash,
Splosh, splash, splish,
I’m as wet as a fish
Soap on my body,
Shampoo in my hair
Scrub-a-dub-dub, now I’m clean everywhere
Splosh, Splash, Splish Splash Splosh
*(Put baby’s name here)* having a wash.
Singing in the Kitchen

Here we go, singing in the kitchen,
Everyone is singing in the kitchen,
I play the lids and you play the spoons,
We’ll wake up the man in the moon,
Now it’s late and we’ve all been fed,
Baby’s nodding his little sleepy head,
Mummy and daddy singing in the kitchen,
All the babies singing in the kitchen,
All together now singing in the kitchen,
Banging on the pot and pan
I sing the words and you sing the tunes
Because we sound so loud
Everybody’s tired and it’s time for bed
So let’s sing quiet and low
Little bitty baby singing in the kitchen,
Banging on the pots and pan
APPENDIX 3

‘MUSIC CD 2’ AND PROGRAM GUIDE FOR M&M-ONLY PARTICIPANTS

MUSIC AND MOVEMENT SELF-INSTRUCTION PROGRAM (M&M-SI)
A Program of Activities for Mother and Infant
Introduction

Having fun with your baby, enjoying their smile and laughter, relaxing together and being able to soothe their discontentment are rewarding moments of motherhood. Ensure that each day you and your baby have rewarding moments, as difficult as some days may seem. This program has been devised to assist you with the building of your repertoire of appropriate activities to share with your baby throughout the day and that such activities become part of your daily routine. Bringing a wealth of songs and rhymes into your baby’s home environment will enhance all areas of his/her development. Already you may have established using songs for different daily activities such as singing lullabies at sleep-time. It is important for you and your baby to continue with whatever activities are successful but perhaps you can use this program to add to your musically rich environment. From the repetition of your musical interaction with your baby, you are providing predictability and a feeling of security.

We all have varying likes and dislikes in our ‘taste’ for music. What this program gives you is a collection of pieces for the purpose of relaxation, the use of interactive songs using touch, facial and vocal expressions, and a variety of choices for rhythmical movement. The use of improvisation should also be encouraged. Make up your own songs and rhymes involving your baby’s name and the daily happenings. Your baby’s positive sense of identity continues to grow with your involvement and other significant adults in his or her life.

Before beginning the activities in this program, it is important for you to assess your baby’s developmental stage. At 2 months, infants lack motor control. Their neck strength requires you to support the head and movements need to be gentle. At all times jerking movements are detrimental as the brain is surrounded only by soft bone and tissue. But this does not stop you from putting on music and dancing with your baby. Up-tempo or faster style music can still be uplifting for your mood, and movement is only restricted to a slower, controlled pace. By 4 months your infant is becoming stronger from the neck, developing more upper torso control. Trotting type movements and ‘stepping out to the side’ style of dancing is fun. By 6 months some infants are sitting up and are quite strong. Dancing with them on your hip is fun (but
watch out for your back). An alternative to holding your baby to dance is to use a sling styled pouch or a conventional strap on type of pouch. This also gives your arms freedom for movement and expression.

Babies hearing development is very susceptible to damage through the exposure of loud and continual noise. This could include the playing of music at a loud volume, household noise of a vacuum cleaner, even someone singing loudly 1 metre away. Think about volume control and how close you are to the source of music when you and your baby listen to it and interact. Research has also shown that the continual use of music as background entertainment causes babies to ‘tune out’ and therefore loses positive developmental effect. Have you heard of the term *Silence is golden?* You may have already discovered how you can enjoy peace and quiet in your role as mother. It is beneficial also to your baby. Allow them to discover the natural sounding environment as they develop their listening skills. All too soon will they grow and become familiar with the range of entertainment media available today.

**Outline of Program Activities**

**Topic 1  Relaxation and dance with your infant**

- Establishing relaxation methods using music
- Using touch and facial expressions to stimulate your baby
- Developing rhythmic movement to music

**Topic 2  Introducing rhymes and songs**

- Singing nursery rhymes and lullabies
- Exploring further with movement and relaxation

**Topic 3  Clapping, Tickling and Knee jogging**

- Exploring ‘the beat’ and vocal expression
- Tickly rhymes, touch and facial expressions
- Fun through movement - knee jogging rhymes and songs
- Improvisation and rhymes
**Topic 4  Musical games to play with your baby**

- Toys as musical instruments
- Peek-a-boo games
- Songs for everyday happenings

**Topic 5  Evoking mood using music and movement**

- Using music to evoke different moods
- Lets dance
- Lets relax
TOPIC 1  Relaxation and dance with your infant

**Why is relaxation necessary?**

The role of mother requires a great deal of energy output. Physically, you are very active and emotionally you can experience feelings that may range from being in high spirits to very low – and this can all happen within the period of one day! Research has shown that before pregnancy, women considered relaxation as an important part of their lifestyle but after giving birth they felt there was no time for relaxation. It is essential for your health and for your baby’s well-being that you take time out to relax together. It is part of enhancing your relationship.

There are many ways of relaxing. Some may find it relaxing to take a walk, to garden or to spend time with friends. Relaxation is personal – what you do to relax may be different to someone else. Music can provide you with another variation. It can provide you with many sources of mood evoking experiences. Some people associate particular pieces of music to memorable moments in their lives. It will also assist in providing you and your baby with moments of pleasure, fun and reward when difficult moments arise in trying to soothe their discontentment. Through your involvement, your baby will learn at this young age to associate different pieces of music with different activities and will benefit developmentally from your interaction.

**Relaxation techniques to use with music**

You may have already discovered the benefits of listening to music for relaxation. It can be as simple as lying comfortably with you baby, closing your eyes and drifting away to the music while stroking their forehead. Other times you may dance around the room while experiencing the feeling of stress release to the rhythm of the music. Different moods will bring about different uses of relaxation.

Using touch with your baby not only assists in further developing the mother-infant bond that is essential for your well-being but it is relaxing your baby’s body, just as a massage may do so on our adult bodies. With music playing in the background and your baby lying comfortable on soft flooring (e.g. on a padded rug), you can begin to massage their bodies by taking their feet and using your thumbs to move in a circular motion on their tiny soles. Delicate oils for use on infants’ skins could be advantageous. Ensure the baby’s feet are bare, as the skin-to-skin touch provides them with a sensory experience. Progress up their legs, tummy, arms and fingers. The slow beat of music will assist with your ‘flow’ of the massage. Talk with your baby, smile, hum to the music. *Relax!*

As previously mentioned, movement to music is another way for you to enjoy relaxing moments with your baby. Rocking or swaying, while gently patting your baby to the slow beat can assist in soothing and adjusting the baby’s mood. But it will only assist when you too are relaxed. Babies sense your tension and synchronise their body movements to what they feel from your body. Sometimes you may like to take up some floor space, so to speak, and slowly ‘waltz’ around the room. Other times you may need to have some fun with a more up-beat tempo and ‘step it out’ to
the music. Just take into account your baby’s development with the varied movement styles – BUT there is nothing stopping you from dancing.

The selections for this first topic of the program have been chosen because of the slow tempo and variation in the use of instruments and voice. Use them as you please.

Have fun and … Relax!

**TOPIC 1 CONTENT OF THE CD**

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Introducing rhymes and songs

How your voice stimulates communication with your baby

The second section consists of traditional rhymes and lullabies. Singing to your baby and using rhymes are very important to your baby’s development. The voice is usually the first form of communication that an infant responds to. They learn to distinguish between the familiar voice of the mother to other adults. Hopefully you have noticed that the way you talk to you baby is different to carrying out a conversation with another adult. Your voice is probably higher in pitch, softer in tone (when soothing you baby) and you are experimenting with playful sound such as ‘blowing raspberries’. You probably also have noticed you vary the tempo of your conversation depending on the activity you and your baby are involved in. The emotions being expressed in the adult’s voice usually produce a longer rising and falling of the accent in the sound of the speech. Take for example the rising and falling of the word *OH*. It would resemble more like ooOHHh. **This is normal and a very special type of communication you have with your baby!** The term often used is *motherese* although is know widely as *Infant-Directed Speech*. Mothers do not only use this type of speech. Fathers and male and female adults sharing emotional speech with babies will also change their tone of voice ‘to suit the occasion’.

Importantly, infants prefer to listen to this type of speech than adult-directed speech (adult to adult speech). Research has shown that infants are stimulated by this type of speech and therefore are more receptive and responsive to your conversation. Infants can also discriminate the emotions being expressed to them in the adults’ voices e.g. a tense voice to a relaxed, passive conversation or a fun, playful tone. So the expressiveness in your voice and the other significant adults in your baby’s life are very important for their emotional development.

By approximately 2-3 months of age, babies will begin to imitate your speech tones. They will vary the pitch of their voice and ‘sing’ back to you. However, this depends on the time you and your baby spend ‘talking together’. They are vocally communicating back to you and your partnership with them continues to develop.

Your voice becomes a vital communication link between you and your baby but your facial expression will also communicate emotions. Naturally, when you are playing with your baby and having fun your face will be beaming a smile. The nursery rhymes and lullabies on the tape are to help rouse varying moods for you and your baby. Sing to your baby using a fun tone of voice when the mood of the moment suits. Change the tone and pace of your voice for when you are using songs to soothe. Sometimes you will sing to your baby while playing on the floor. Other times it will be when you are dancing around the floor or when you may be rocking or swaying, varying the vocalising to a hum. Choose the music to match the pace or the mood of the moment.

The first arrangements of nursery rhymes are up-tempo and include a combination of vocal and instrumental pieces. They progress to slower, more traditional versions. The words of most songs are provided for you at the end of this booklet.
TOPIC 2  CONTENT OF THE CD

Track

8   Introduction/Instructions

9   Nursery rhyme medley: *Baa baa black sheep*, *Hey diddle diddle*, *Twinkle twinkle little star*, *Little Miss Muffet*, ★Frere Jacques.*

10  A medley.

11  Instructions

12  *Baa baa black sheep.*
    From Mike Jackson (1994), *Sleepy Songs for Little Kids*. Flying Wombat
    Music and Hat Trick Music.

13  *Twinkle Twinkle Little Star*
    From *There’s a bear in ther* (1987), Australian Broadcasting Corporation,
    EMI

14  *Gonna Rest Now.*

15  Instructions

16  *Twinkle Twinkle Little Star* (Instrumental)
    From Mike Jackson (1994), *Sleepy Songs for Little Kids*. Flying Wombat
    Music and Hat Trick Music.

17  *Brahms Lullaby* (Piano)
    Productions

18  *Wiegenlied* (This is another version of Brahms Lullaby).
    Broadcasting Corporation, EMI.

The nursery rhyme medley - *is not only fun to sing to with your baby but you
could also try dancing.*

Because there are no words to *The drumming medley* - let yourself dance free.
Hold your baby in a safe position…. start moving to the beat…..and away you go!!!!

Slow down the pace….and relax… to *Baa Baa Black Sheep*

*Twinkle Twinkle Little Star* is a good introduction for using your hands expressively
when singing to your infant. For example, you can have your baby positioned
comfortably on the floor, and as you focus on the baby with your singing, you can use fingers to ‘twinkle’, putting them up high as the words suggest, then make a diamond shape out of your fingers. Depending on your baby’s development, he/she may not focus your hands. Don’t think that your effort is going unnoticed – your baby is enjoying your performance and importantly, it is enjoyable for both of you.

**Twinkle Twinkle Little Star** (twinkle fingers)
How I wonder what you are,
Up above the world so high, (put them up high)
Like a diamond in the sky, (make the diamond shape)
Twinkle Twinkle little star, How I wonder what you are.

These following lullabies can be used for singing and movement – such as rocking and swaying. You be the judge as to how they are best used to create a relaxed mood for you and your baby.

**Gonna Rest Now**
Gonna rest now,
Gonna rest now,
My head is heavy,
So I’m gonna rest now

**Brahms Lullaby**
Go to sleep
Now in peace,
My- own little baby, (Insert your baby’s name)
You're a tired little thing,
So- sleep while I sing.

When the bird,
Leaves it nest,
You will wake from your rest,
When the bird leaves its nest,
You will wake from your rest

**TOPIC 3 Clapping, Tickling and Knee Jogging**

By approximately 3 months old, babies are responding to verbal and visual stimulation by cooing and smiling, with coordinating arm and leg movements that show a sense of excitement in their bodies. Using tickling and knee jogging rhymes in their daily routines are great fun …for you and your baby. You will get the pleasure of seeing your baby respond to you, and your baby will have the great pleasure of experiencing fun with you. The reward is mutual for you both. Your interactions with your baby express your love and extends into not only caring for their primary needs such as feeding but providing them with the emotional support that builds on their sense of security and well-being.
Activities using touch on your baby such as tickling, gently tapping their feet together or taking their hands to clap can be enhanced through the use of rhymes because of the rhythmical feeling created in the pattern of the words. These activities can be done while you are changing your baby or during playtime on the floor. In fact, anytime of the day when it is time for some fun is a great time for a tickle.

You are a creative source for your baby. Experiment with your voice – vary the pace of the rhymes, use ‘squeaky’ sounds e.g. for mouse noises and build on your baby’s sense of excitement. Use different fun expressions in your face – make your baby laugh. Change the words to rhymes and songs or make up your own versions that involve you and your baby throughout the day. Be spontaneous!

**TOPIC 3 CONTENT OF THE CD**

**Track**

19 Introduction/Instructions

20 **Shoe a little horse.** (Traditional)  (Voice of Wendy Vlismas)

Shoe a little horse,
Shoe a little mare,
But let the little colt go bare, bare, bare.

Tap your baby’s feet gently to create a beat to the rhyme for this one. Make sure the little feet are bare….this will allow for freedom of movement and the stimulation of your touch to be felt

21 Instructions

22 **Pat-a-cake.** (Traditional with variation by Wendy Vlismas)

Pat-a-cake,
Pat-a-cake,
Pat-a-cake,
Baker’s man.
Bake me a cake,
As fast as you can.
Pat it and prick it,
And mark it with B,
And put in the oven for baby and me.

You could clap your baby’s hands together with this rhyme. Substitute baby with your baby’s name and for me, say Mummy

23 Instructions

24 **Round and round the garden.** From Gary and Carol Crees (1999), *Music, Movement and Dance*. Open Learning Institute of TAFE. Queensland
Round and round the garden,
Went the Teddy Bear,
1 step, 2 steps and …..tickle him/her under there.

Round and round the garden,
Like a little mouse
1 step, 2 steps…in her little house

Round and round the garden,
Like a pussy cat
1 step, 2 steps…tickle her there like that.

Your baby’s tummy becomes the garden. Use your finger to make a circular motion
Try pausing your voice after 1 step, 2 step…and….(pause)…when you come to tickle under there, quicken up the pace and give your baby a tummy tickle.

Pizza Pizza
From Gary and Carol Crees (1999), Music, Movement and Dance.
Open Learning Institute of TAFE. Queensland

Pi-zza, Pi-zza pum-per-nickle,
This little girl/boy deserves a tickle
One for her/his nose….
And one for her/his toes….
And for her/his tummy where the peanut butter goes.

A suggestion is to clap your baby’s hands or feet to begin this rhyme. When is come
to tickle, ‘create your own moves’. The words then lead you to the next actions.nose, toes and tummy

Slowly, Slowly. (Traditional) (Voice of Wendy Vlismas)
Slowly, slowly, very slowly,
Up the wooden rail,
Slowly, slowly very slowly,
Goes the garden snail.
Quickly, quickly, very quickly,
Round the little house,
Quickly, quickly very quickly,
Goes the little mouse.

You could creep your fingers slowly up your baby’s tummy or legs to begin. The words suggest a contrast in the speed (tempo) so your voice can change from slow to quick. Also vary the pitch of your voice…Low for Slowly, and High for Quickly. Your baby will learn from your repetition and anticipate the excitement each time you perform.
27  **This little piggy.** (Traditional)  
This little piggy went to mar-ket,  
This little piggy stayed at home,  
This little piggy had roast beef,  
And this little piggy had none,  
And this little piggy went…..  
Wee wee wee wee all the way home.  

(Voice of Wendy Vlismas)

Use baby’s fingers and toes as the ‘little piggies’ and then on *wee wee wee wee* run up the tummy.  
You could pause your voice on *went* to build on the excitement and anticipation for baby.

The remainder of rhymes in this section are great for the rhythmical use of knee jogging. Create the rhythmical feel of a horse trotting. Remember that your baby may be too young for actually placing on your knee and supporting to the rhythm. Use the variation of placing him/her in your arms resting on your lap and gently rock up and down to the beat of words.

Try *‘tongue clicking’* as a substitute for words at varying times. Are you wondering what is tongue clicking?

You can make a *clip clop* sounds using your tongue on the roof of your mouth. Vary your lip movements to make different sounds.

Your baby will love to hear the sounds and to watch your lips moving.

28  **Instructions**

29  **Bouncey Bouncey**  

**Bouncey Bouncey up and down**  
Bouncing all the way to town  
Bouncing up and bouncing down,  
Bouncing all the way to town.

Use pitch variations in your voice, making it higher on the word *up* and lower on the word *down*. Pause on your voice could also be use on the words *up* and *down*. Vary you facial expression.

*Blinkety blonk, Blinkety blonk*  
Horses gallop and horses romp  
Blinkety blonk, Blinkety blonk,  
Gallop and gallop and gallop and…  
PLONK!

On PLONK, you could gently lower baby down from an upright ‘sitting’ position.

**31**  *To Market, To Market*  From Gary and Carol Crees (1999), *Music, Movement and Dance*. Voices of Wendy Vlismas and Carol Crees.

*To market to market to buy a fat pig*  
Home again, Home again *jiggety jig,*  
*To market to market to buy a fat hog*  
Home again, Home again *jiggety jog,*  
*To market to market to buy an old hen*  
Home again, Home again *rickety ren,*  
*To market to market to buy a young chick,*  
Home again, Home again *rickety rick,*  
*To market to market to buy a peach pie*  
Home again, Home again baby and I.

The accompaniment of the music keeps the beat of this rhyme constant.  
**Keep your knees bobbing!**

Alternatively, you can dance to this song – it has the ‘gallop’ rhythm, so up you get and gallop (safely) around the room.


*Gregory Griggs, Gregory Griggs*  
Had twenty seven different wigs  
He wore them up,  
He wore them down,  
To please the people of the town.

On the words *up* and *down* you could vary the jogging motion and bring your knees higher then lower to give your baby the added sense of excitement. As for *To Market To Market*, this song can also be used as a gallop song.
**Appendices**


Ride a cock horse to Bambury Cross,
To see a fine lady upon and white horse
With rings on her fingers and bell on her toes,
She shall have music where ever she goes. ♫ ♫ ♫ ♫

You can add the sound of bells in this song. If you don’t have small ‘jingle bells’, improvise the sound with one of your baby’s rattles.

34  Instructions


Dance to your daddy my little laddie (lassie),
Dance to your daddy my little lamb,
You shall have a fishy on a little dishy,
You shall have a fishy when the boat comes in.
Dance to your daddy my little laddie (lassie),
Dance to your daddy my little lamb,
Dance to your daddy my little laddie (lassie),
Dance to your daddy my little lamb,

This is a traditional song and was added in this section as a ‘wind down’.

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As your baby develops you will realise that they love to have fun. Research has shown that infants are born social beings and need the stimulation of fun interactions for their overall well-being. As an infant, their fun comes from you and others around them creating the environment and atmosphere. When your baby smiles at you it is your instant response to smile and talk to him/her in a positive tone. Other adults also experience the joy of responding to an infants smile. By establishing routine types of games throughout the day, together with spontaneous play, you and your baby are continually building on the mutual reward that you gain from having fun.

**Peek-a-boo games**

By approximately 4 months (or younger), babies begin to respond to the game of peek-a-boo. This type of game can be played while you are changing your baby, during floor play, outside under the shade of a tree…or anywhere.

Begin simply!
Cover your face with your hands. Use words such as  *Aaaah… BOO to you,* opening hands on *Boo.* Pause on *Ah…* building anticipation/excitement for baby. Of course you need to use facial expressions that match the excited tone in your voice.

Build on the game by adding  *Where’s… baby* (Insert your baby’s name).  
*Ah…Boo to you*

Progressing on from these simple games, you can introduce a sensory stimulus using a lightweight scarf. It is ideal to use one that is see through and has a silky feel to it.

Initially, cover *your* face with the scarf and play the above game to get the baby used to the different visual effect.

To introduce the feeling of the scarf to the baby, wave it gently over his/her face – as if you were in the breeze. Talk with them about the feeling. Then, if you think your baby is secure with this feeling, as you are waving it across say… *Where’s… baby* (Insert your baby’s name) *Ah…Boo to you,* as you did above.

As part of their development, your baby will begin to reach for the scarf (and usually try putting it in the mouth, as they are in a sensory developmental stage). Gradually as she/he becomes self-supporting in a sitting position, you can place the scarf on to their head and they will reach to pull it off for a game of peek-a-boo. Initially, baby may not enjoy their face totally covered so put the scarf to forehead level. This is why a see through scarf is ideal as they can feel secure by being able to see you but also have the sensation of feeling the scarf.

As an extension to this game you could use the scarf to cover a toy e.g. Teddy and play peek-a-boo. You will find your baby may not be responsive to this game until 6 months or older.

**A PEEK-A-BOO Song** (make up your own tune to it)

*Who is hiding there?* Place a see-through scarf over baby’s head.

*Who is hiding there?*

*It’s ……. (Insert baby’s name)* Take scarf away.

*It’s ……. As baby develops, they will enjoy taking the scarf away themselves*  

*That who’s hiding there.*
Using toys to play games with your baby

Toys are not only a visual stimulus for your baby but they are also a source of exercising developing motor skills such as the hand grasp and kicking. The shaking of a rattle enables them to experiment with sound making. They may be to the age where they are also enjoying kicking objects while having floor play. For an inexpensive idea, put some paper e.g. wrapping paper, up against the back of a soft lounge. They love to kick it because of the sound that they create. When they become self-supporting in the sitting position they will also enjoy banging one object on another.

This is when the wooden spoon and the old kitchen saucepan will came into play

Everyday happenings to stimulate the use of music and movement with your infant

Your baby is continually learning about his/her surroundings through your conversations and experiences you provide. Music can be combined with everyday happenings such as taking your baby for a walk, sitting in the shade of a tree and feeling the breeze, having fun in the bath or singing in the kitchen. No doubt you are building on your repertoire of songs you sing. As previously suggested, make up your own songs and rhymes that involve your daily happenings. Topic 4 songs may also be helpful to you in your daily routines you and your baby share.
**TOPIC 4**  
**CONTENT OF THE CD**

**Track**

36 **Introduction/Instructions**

37 **Little baby**

38 **Wiggle your toes in the sun**

39 **Bend with the wind**

40 **Rain is falling down**

41 **Bathtime**

42 **Splish Splash Splosh**

43 **All the fish**

44 **Singing in the kitchen**

45 **Sing a Rainbow**

Of course, these songs about the outdoors/weather can be used anytime to stimulate your use of sensitive touch and rhythmical movement with your baby…and to just relax!!!

**Wiggle your toes in the sun**

Lazy and warm, lazy and warm
Wiggle you toes in the sun

**Bend with the wind**

Bend with the wind
Sway..... Sway.....
And bend, bend with the wind
Rain is falling down is another song to use your hands/ fingers expressively. Use the words as a guide to your actions.

Sing a rainbow may be a song you remember from you’re your childhood. It is a ‘feel good’ song so…. sing everything you see

Rain is falling down,
Rain is falling down,
Pit-a-patter, pit-a-patter,
Rain is falling down.

Sing a rainbow
Red and yellow and pink and green
Purple and orange and blue,
I can sing a rainbow, sing a rainbow,
Sing a rainbow too.
Listen with your eyes,
Listen with your eyes,
And sing everything you see,
I can sing a rainbow, sing a rainbow,
Sing a rainbow too,
Red and yellow and pink and green
Purple and orange and blue,
Now we can sing a rainbow,
Sing a rainbow,
Sing a rainbow too.

For bath time
Your baby may now be enjoying having fun in the bath. Singing and playing during this time can be fun for you both. The splashing sounds and toys in water can also add to the fun.

All the fish are swimming in the water, swimming in the water
All the fish are swimming in the water,
Fol-de, rol-de-rol-de- ray.

Splish, Splash, Splosh
I’m having a wash,
Splosh, splash, splish,
I’m as wet as a fish
Soap on my body,
Shampoo in my hair
Scrub-a-dub-dub, now I’m clean everywhere
Splosh, Splash, Splish Splash Splosh
(Put baby’s name here) having a wash.
Singing in the Kitchen

Here we go, singing in the kitchen,    All together now singing in the kitchen,
Everyone is singing in the kitchen,    Banging on the pot and pan
I play the lids and you play the spoons, I sing the words and you sing the tunes
We’ll wake up the man in the moon,    Because we sound so loud
Now it’s late and we’ve all been fed,   Everybody’s tired and it’s time for bed
Baby’s nodding his little sleepy head,   So let’s sing quiet and low
Mummy and daddy singing in the kitchen, Little bitty baby singing in the kitchen,
All the babies singing in the kitchen,   banging on the pots and pan

Have fun singing and clapping or dancing and clanging around the kitchen...or any place the music takes you
**TOPIC 5 Evoking mood using music and movement**

The final section to the program is a selection of pieces that have been chosen on the basis of variation in style. They vary in instrumental and vocal tone and in tempo, which gives the pieces individuality in creating different moods. Over time it is hoped that you and your baby will choose music that can be enjoyed together and that you may share it with others to enrich your lives. Value each musical experience.

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**TOPIC 5 CONTENT OF THE CD**

**Track**

46  Introduction/ Instructions


APPENDIX 4

F2F-ONLY GROUP
THE PLAY AND CHAT PROGRAM
The program, while informal in presentation incorporated particular discussion topics over the 5 weeks, including

1. Transition to parenthood
2. Early parenting experiences
3. Infant development and play
4. Affective infant interaction using touch and speech
5. Having fun with your infant

**Week 1**

To ease the mothers into the small group setting, the researcher facilitated discussions on the value of forming social networks in relation to the transition to motherhood, and common issues associated with early parenting. This provided mothers with the opportunity to discuss their parenting experiences and to form an understanding that other mothers may be experiencing similar events. While this session did not focus on infant development the researcher requested the mothers to have the infants centrally grouped on the floor space to allow infant socialisation and so the researcher could sit on the floor with the infants to make contact by touching their hands and feet. This interaction by the researcher included positive facial gestures and infant directed speech. Making positive contact with the infant was important not only for the infant’s feeling of security within this environment but also to develop a rapport between the researcher and the mother and to model positive interactive behaviour. The researcher commented, during the group discussion, on the importance of using touch and affective speech-tone with infants.

**Week 2**

A follow-up of the Week 1 discussions provided an introduction to the second session. To bring focus the discussion on infant behaviour and development mothers were invited to bring a toy or rattle with which their infant enjoyed playing. Using the toys, the researcher demonstrated play techniques and discussed general information about infant visual and motor development. The researcher made encouraging remarks to the mothers about their infants’ behaviour and also made direct contact with the infants using infant directed speech and expressive facial
gestures. During this session the infants’ toys were exchanged among the mothers so both mother and infant could experience playing with different toys in order to have a variety of activities, promoting a sense of exploration and fun in the group. The benefits of using the outdoor environment were also emphasised - providing time away from the home, exercise for the mother, and relaxation for the infant via the rhythmical motion of either being in the pram or in an infant harness strapped to the mother, and the visual and aural stimulation of the outdoors.

**Week 3**

It was anticipated that by Week 3 a relaxed group atmosphere would be established and that mothers would be comfortable having open discussions about their parenting and enjoying interacting with their infants. The focus of this session was on developing new interactive games for mother and infant. The researcher provided large soft inflatable balls approximately 45 centimetres in diameter. With the infants placed on their stomachs over the balls and supported by the mothers, the mothers sat on the floor and gently rolled their infants forward and backward. Mothers kept eye contact with their infants and spoke reassuringly, praising them. This activity was partly for infants’ relaxation and motor development but also for mothers to experience different interaction techniques. Another activity during this session was “peek-a-boo”. Although peek-a-boo games were included in the M&M program as singing activities, the peek-a-boo games for this play program were used to promote mother’ playful interactions through speech and facial gesturing using scarves as stimuli to rouse infant responsiveness. The procedure for this part of the program was similar to that of the M&M program because of the need to maximise mothers contact with their infants and to introduce the gentle use of scarves as a new sensory stimulus to the infant, but explicit use of music and rhythmic movement was not included. Mothers positioned their infants and themselves on the soft flooring. Straddling the infants so they could make mid-line face-to-face contact, mothers introduced the silk-like, see-through scarves by placing them over their own heads to begin, and playing peek-a-boo by saying to the infants ‘where’s Mummy?’ and then releasing them with ‘ah boo’. The scarves were introduced to the infants by breezing them over the infants faces while mothers asked ‘where is my ...(baby’s name)’ and on raising the scarves mothers responded with ‘aaah boo, there you are’. Mothers would continue with their conversation with the infant by asking something like
‘how was that? Oh wasn’t it fun’ and then continue to repeat the activity. These actions were used to achieve a contoured-like flow in the communicative process by building up the infants’ excitement and then for this excited energy to be released through the infants’ reactions to the activity.

**Week 4**
A repeat of Week 3 activities was used to give mothers the opportunity to demonstrate play techniques and infant reactions that may have developed over the week. In addition, in this session the use of books and hand puppets appropriate for stimulating infant attention were introduced. The researcher demonstrated story telling techniques using vocal intonation and the use of pausing on words, as was done for the peek-a-boo games. Ideas of making inexpensive play items were discussed (such as old saucepan lids and wooden spoon for sound making as was suggested in the M&M program) and the researcher made available books that included appropriate play resources for infants.

**Week 5**
This final session included the variety of play resources that had been used in Weeks 3 and 4, and allowed mothers and infants to enjoy the informal setting that had been created through their interactions as a group. The researcher discussed with the mothers whether they were interested in continuing to meet as a group, independent of the researcher. Picnics in parks, taking infants walking and meeting for coffee, and starting their own playgroup were suggested.
APPENDIX 5

UNIVERSITY OF WESTERN SYDNEY ETHICS APPROVAL
Ethics Review Committee (Human Subjects)

CERTIFICATE OF APPROVAL

To: Ms Wendy Vlismas
    Professor Denis Burnham, Dr Stephen Malloch
    Faculty of Arts and Social Sciences

Telephone: 07 3878 4898
Date: 7 August 2000
Project Title: Mother and Infant Interactions
Protocol No: 2000/040

The Ethics Review Committee (Human Subjects) approved the above protocol on 24/07/2000.

The Principal Investigator is required to:

(a) provide an Annual/Progress/Completion Report on matters including:
    . compliance with the requirement that all data must be stored securely at
      the University for at least five years (unless otherwise specified)
      following publication of the research.
    . compliance with the requirement that all data is stored in such a way that
      the anonymity of participants is preserved.
    . compliance with approved consent procedures and documentation.

(b) to report immediately anything that might affect the ethical acceptance of the
    protocol to the Committee, including:
    . adverse effects on subjects/participants;
    . proposed changes in the protocol;
    . unforeseen events that might affect continued ethical acceptability of the
      project.

The protocol is approved until 31/10/2001 subject to compliance with the conditions
specified above. An Annual/Progress/Completion Report is due on 31/10/2001. If the
report is not received by this date, ethics clearance for the project may be cancelled.

It should be noted that it is the responsibility of the first named investigator to ensure
ethical practice in research and compliance with the above requirements. The above
protocol number must be quoted in all future correspondence regarding this protocol.

Dr Mary Hawkins
Chair

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APPENDIX 6
QUEENSLAND HEALTH ETHICS APPROVAL
MEMORANDUM

To: Ms Wendy Vlismas
Child and Community Health Services

Copies To: Ms Joan Pratt

From: Dr Alan F Isles
District Manager
Royal Children’s Hospital &
Health Service District

Tel No: (07) 3636 8262
Fax No: (07) 3636 7215
File Ref:

Date: 25/09/00

Subject: Research study on Mother/Infant Interaction

Your research application was considered and approved by District Executive on 25.09.00.

Sincerely,

Dr Alan F Isles
District Manager
Royal Children’s Hospital and
Health Service District
24/9/2000
Ms. Wendy Vlismas,
PO Box 135,
KENMORE. Q. 4069.

Dear Ms. Vlismas,

Mother and infant interactions
Ethics approval

Many thanks for your caring letter of 18th August.

I note that you propose to study joint interactions between mothers and infants, looking particularly at the role of music and movement. I note that you will be seeking to recruit one hundred volunteer first-time mothers through the co-ordination of Dr. Neil Wigg and our professional colleagues at the Community Child Health Services.

Thank you also for providing the Information Sheet and the copy of the Consent Form. Thank you also for forwarding a copy of a Certificate of Approval from the Ethics Review Committee of the University of Western Sydney.

I have now reviewed the proposal in full; and am very happy to approve it executively on behalf of all members of the Ethics Committee to whom I will send a copy of this letter to help with communication. Thank you also for forwarding the multiple copies for such members.

I would point out that Ethics approval is distinct from Executive approval which is potentially given after consideration, by Professor Alan Isles, General Manager, to whom I will send a copy of this letter to help with communication. There is a requirement that you send, each twelve months, a brief summary report (suggest two paragraphs) noting

1. Progress to date; and
2. Any issues relevant to ethical implications of the study.

Warmest and best wishes,

Professor John Pearn.
Chair,
Royal Children’s Hospital and District Health Service Ethics Committee.

C/c. Ethics Committee files (Professor John Pearn).
Members of the Ethics Committee.
Professor Alan Isles, District Manager, Royal Children’s Hospital & District.
APPENDIX 7

MATERNAL AND INFANT HEALTH CENTRES
Table A1 *Maternal and Infant Health Centres accessed for recruitment and to carry out M&M-F2F and P&C-F2F sessions*

<table>
<thead>
<tr>
<th>Region of Brisbane (MIHC)</th>
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<td>Northern District</td>
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APPENDIX 8

PARTICIPANT RECRUITMENT BROCHURE
A STUDY OF FIRST-TIME MOTHERS AND INFANTS of 2 to 6 MONTHS OF AGE

VOLUNTEERS NEEDED TO TAKE PART IN A RESEARCH PROJECT

Recent research has proven the benefits of mothers and infants interacting in playful behaviour. Both mothers’ and infants’ enjoyment of each other may assist the infant development and the mother in her role as a parent.

The project will be conducted by Wendy Vlismas, (a post-graduate research student of the Macarthur Auditory Research Centre, University of Western Sydney) and will be carried out at this clinic. Please call me if you are interested in finding out more about the project and joining the program. My number is 38784898. I also have an answering service for when I am unavailable. Leave your name and number, stating you are interested in the program and I will happily return your call.

I look forward to hearing from you!
APPENDIX 9

GENERAL INFORMATION QUESTIONNAIRE
GENERAL INFORMATION QUESTIONNAIRE

The following questions relate to general information about yourself and your baby.

1. Your Name:..............................................................................................
2. Your Age:.................................................................................................
3. Your Baby’s Name:....................................................................................
4. Your Baby’s Date of Birth:.........................................................................
5. Your Educational Attainment/Profession:..............................................
6. Were you born in Australia?           Yes / No  
   If No, what is your country of origin? .....................................................
7. Is English the first spoken language in your home?           Yes / No  
   If No, What is the main language spoken? .............................................
8. Your Marital Status:   Please circle  
   Single   Married   Cohabiting with partner   OR State otherwise  
   .............................................................................................................
9. Does your baby’s father actively share the parenting role with you? Yes / No  
   If YES, can you describe his involvement ..............................................
   .............................................................................................................
10. Do you have a network of family members and/or friends that you seek social  
    support from? Yes / No  
    If so, can you nominate for what purpose you utilize their support?  
    Family.....................................................................................................
    Friends.................................................................................................
11. Would you refer to your pregnancy as being Normal? Yes / No  
    If No, what was the concern during your pregnancy..............................
12. Since your baby’s birth would you generally regard your health as being well?  
   Yes / No  
   If No, what have been the main concerns for your health during this period?  
   ………………………………………………………………………………………………………

13. Was your baby full term?  
   Yes / No  
   If No, how many weeks premature was your baby? ………………………

14. Is your baby of good health?  
   Yes / No  
   If No, what signs does your baby show of being otherwise?  
   ………………………………………………………………………………………………………

15. Would you describe your infant as being difficult or temperamental?  
   Yes / No / Unsure  
   If Yes or Unsure, could you describe the types of behaviours your infant displays?  
   ………………………………………………………………………………………………………

16. Have you experienced any difficulties in your mothering role that have been of 
   concern to you?  
   Yes / No  
   If Yes, could you describe the difficulties?  
   ………………………………………………………………………………………………………

THANK YOU FOR ANSWERING THIS QUESTIONNAIRE
APPENDIX 10

MIA QUESTIONNAIRE
MIA Questionnaire

THE FOLLOWING QUESTIONNAIRE IS ASKING ABOUT THE ACTIVITIES YOUR AND YOUR INFANT DO TOGETHER AS A ROUTINE PART OF YOUR WEEK.

The questions require you to circle a word or term that best describes your answer. There is also a rating of numbers from 1-7 under the words that may be used to assist you in deciding your answer.

1. My baby and I meet socially with other mothers and their babies on a regular basis

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

2. I take my baby for an outdoor stroll in his/her pram

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

3. I sing songs to my baby

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

4. I take my baby shopping with me

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

5. I rock my baby to comfort him/her

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

6. I talk with my baby while we are at home together

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

7. My baby and I visit the maternal & infant health clinic

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7

8. I take time out to relax with my baby

   Never  Very Rarely  Rarely  Sometimes  Often  Almost Always  Always
   1    2    3    4    5    6    7
9. I dance around the house to music with my baby

<table>
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<tr>
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<th>Sometimes</th>
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</table>

10. My baby and I play together during the day e.g. on the floor, during bath-time

<table>
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THANK YOU FOR YOUR PARTICIPATION IN ANSWERING THIS QUESTIONNAIRE
Reliability for MIA pretest

Case Processing Summary

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a. Listwise deletion based on all variables in the procedure.

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Reliability for MIA posttest

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*a. Listwise deletion based on all variables in the procedure.*

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APPENDIX 11

MIMI QUESTIONNAIRE
MIMI Questionnaire

THE FOLLOWING QUESTIONNAIRE ASKS SPECIFIC QUESTIONS ABOUT ACTIVITIES THAT YOU MAY ENJOY AND SHARE WITH YOUR INFANT

Some questions require you to circle a word that best describes your answer. There is also a rating of numbers from 1-7 under the words that may be used to assist you in deciding your answer.

Other questions require a written answer.

1. I enjoy music as part of my everyday life.

Never    Very Rarely    Rarely    Sometimes    Often    Almost Always    Always
1         2             3         4           5         6                     7

If you circled the word Never proceed to Q.4. Otherwise continue to Q2.

2. What style/s or type/s of music do you enjoy?

...................................................................................................................................................................
...................................................................................................................................................................

3. Can you describe how you enjoy using this music?

...................................................................................................................................................................
...................................................................................................................................................................

4. I enjoy dancing

Never    Very Rarely    Rarely    Sometimes    Often    Almost Always    Always
1         2             3         4           5         6                     7

5. If you have circled Very Rarely, Sometimes, Often, Almost Always or Always, can you give a description of how you use dance. You may also wish to name/describe the music you enjoy as an accompaniment.

...................................................................................................................................................................
...................................................................................................................................................................

6. I enjoy music together with my baby.

Never    Very Rarely    Rarely    Sometimes    Often    Almost Always    Always
1         2             3         4           5         6                     7

If you circled the word Never proceed to Q.8. Otherwise continue to Q7.

7. Can you describe how you use music with your baby

...................................................................................................................................................................

8. I sing songs to my baby

\[
\begin{array}{cccccccc}
\text{Never} & \text{Very Rarely} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Almost Always} & \text{Always} \\
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}
\]

9. If you have circled Very Rarely, Rarely, Sometimes, Often, Almost Always or Always, could you name some of the songs you sing?

……………………………………………………………………………………………

……………………………………………………………………………………………

10. I rock my baby

\[
\begin{array}{cccccccc}
\text{Never} & \text{Very Rarely} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Almost Always} & \text{Always} \\
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}
\]

11. If you have circled Very Rarely, Rarely, Sometimes, Often or Always, could you describe when/how you rock your baby?

……………………………………………………………………………………………

……………………………………………………………………………………………

12. I use touch (e.g. stroking, tickling) with my baby.

\[
\begin{array}{cccccccc}
\text{Never} & \text{Very Rarely} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Almost Always} & \text{Always} \\
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}
\]

13. If you have circled Very Rarely, Rarely, Sometimes, Often, Almost Always or Always, could you describe how you use touch with your baby?

……………………………………………………………………………………………

……………………………………………………………………………………………


\[
\begin{array}{cccccccc}
\text{Never} & \text{Very Rarely} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Almost Always} & \text{Always} \\
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}
\]

15. If you have circled Very Rarely, Rarely, Sometimes, Often, Almost Always or Always, could you describe how you use massage with your baby?

……………………………………………………………………………………………

……………………………………………………………………………………………

16. I use music for relaxation together with my baby.

\[
\begin{array}{cccccccc}
\text{Never} & \text{Very Rarely} & \text{Rarely} & \text{Sometimes} & \text{Often} & \text{Almost Always} & \text{Always} \\
1 & 2 & 3 & 4 & 5 & 6 & 7 \\
\end{array}
\]
17. If you have circled Very Rarely, Rarely, Sometimes, Often, Almost Always or Always, could you describe how you use music for relaxation with your baby?

THANK YOU FOR YOUR PARTICIPATION IN ANSWERING THIS QUESTIONNAIRE
Reliability for MIMI pretest

Case Processing Summary

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a. Listwise deletion based on all variables in the procedure.

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Item-Total Statistics

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<th>Cronbach's Alpha if Item Deleted</th>
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Scale Statistics

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Reliability for MIMI post-test answers

**Case Processing Summary**

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a. Listwise deletion based on all variables in the procedure.

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<th>Cronbach's Alpha if Item Deleted</th>
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<td>.773</td>
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### Scale Statistics

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APPENDIX 12

M&M PROGRAM EVALUATION QUESTIONNAIRE
M&M PROGRAM EVALUATION QUESTIONNAIRE
M&M-F2F Group

THE FOLLOWING QUESTIONNAIRE ASKS YOU TO EVALUATE THE PROGRAM

Mother’s Name:  
Baby’s First Name:  
Baby’s DOB:  

The following questions require you to circle a word or term that best describes your answer.  
There is also a rating of numbers from 1-5 under the words that may be used to assist you in deciding your answer.

Please select from the following:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Other questions require a written answer.

1. The program has increased my knowledge of songs that I share with my baby.

2. The program has increased my knowledge of musical games and activities that I share with my baby.

3. The program has increased my knowledge of the use of appropriate rhythmical movement that I share with my baby.

4. If you have circled Agreed or Strongly Agree, could you describe how the program has assisted you with your use of music and movement activities you share with your baby?

…………………………………………………………………………………………
…………………………………………………………………………………………

5. The program has increased the enjoyment of music and movement activities that I share with my baby.

…………………………………………………………………………………………
…………………………………………………………………………………………

348
6. Can you describe your baby’s reactions to you while you were using the music and movement activities with him/her.

……………………………………………………………………………………………………
……………………………………………………………………………………………………

7. The tape was useful to me.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

8. If you have circled *Agree or Strongly Agree*, could you comment on how often you used the tape/CD?
(e.g. Once of week, a few times a week, every day).

……………………………………………………………………………………………………

9. Can you describe how you used the tape?

……………………………………………………………………………………………………
……………………………………………………………………………………………………

10. I would continue to use all the sections of taped music

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

11. I would continue to use only some the sections of taped music

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

12. If you circled *Agree or Strongly Agree* to Q10 or Q11, can you nominate specific activities and specific pieces of music that were beneficial to you and your baby?

……………………………………………………………………………………………………
……………………………………………………………………………………………………

13. If you circled *Strongly disagree, Disagree or Undecided* to Q10 or 11, can you nominate specific activities and specific pieces of music that were beneficial to you and your baby?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
For Question 14, circle (a) OR (b) OR (c)

14 (a) It was very beneficial to me to participate with my baby in a group while being instructed?

OR

(b) A self instructed package of a tape and booklet would have been of equal benefit to me with my baby?

OR

(c) A self instructed package of a tape and booklet would have been more beneficial to me with my baby?

15. Was the content of the program Adequate?
   Too much?
   Too little?

16. I have benefited from the program in other ways that have not been mentioned in this questionnaire.

   Strongly disagree  Disagree  Undecided  Agree  Strongly agree
   1  2  3  4  5

17. If you circled Agree or Strongly Agree, could you describe all the benefits (other than those relating to music) you feel you have gained?

   ………………………………………………………………………………………………………………………
   ………………………………………………………………………………………………………………………

18. My baby and I together have benefited from the program in other ways that have not been mentioned in this questionnaire.

   Strongly disagree  Disagree  Undecided  Agree  Strongly agree
   1  2  3  4  5

19. If you circled Agree or Strongly Agree, could you describe all the benefits (other than those relating to music) you feel you and your baby have gained?

   ………………………………………………………………………………………………………………………
   ………………………………………………………………………………………………………………………

20. The activities from the program have increased enjoyable time that my baby and I spend together.

   Strongly disagree  Disagree  Undecided  Agree  Strongly agree
   1  2  3  4  5
APPENDIX 12 CONTINUED

M&M PROGRAM EVALUATION QUESTIONNAIRE
M&M-Only group (Self Instruction program)

THE FOLLOWING QUESTIONNAIRE ASKS YOU TO EVALUATE THE PROGRAM

Mother’s Name:
Baby’s First Name:
Baby’s DOB:

The following questions require you to circle a word or term that best describes your answer. There is also a rating of numbers from 1-5 under the words that may be used to assist you in deciding your answer.

Please select from the following:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Other questions require a written answer.

3. The program has increased my knowledge of songs that I share with my baby.

Strongly disagree | Disagree   | Undecided | Agree    | Strongly agree
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tbody>
</table>

4. The program has increased my knowledge of musical games and activities that I share with my baby.

Strongly disagree | Disagree   | Undecided | Agree    | Strongly agree
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

3. The program has increased my knowledge of the use of appropriate rhythmical movement that I share with my baby.

Strongly disagree | Disagree   | Undecided | Agree    | Strongly agree
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. If you have circled *Agree or Strongly Agree*, could you describe how the program has assisted you with your use of music and movement activities you share with your baby?

...................................................................................................................................................

....................................................................................................................................................
5. The program has increased the enjoyment of music and movement activities that I share with my baby.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

6. Can you describe your baby’s reactions to you while you were using the music and movement activities with him/her.

…………………………………………………………………………………………………………………………

…………………………………………………………………………………………………………………………

7. The tape was useful to me.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>4</td>
<td>5</td>
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</tbody>
</table>

8. If you have circled Agree or Strongly Agree, could you comment on how often you used the tape/CD? (e.g. Once a week, a few times a week, every day).

…………………………………………………………………………………………………………………………

9. Can you describe how you used the tape?

…………………………………………………………………………………………………………………………

…………………………………………………………………………………………………………………………

10. I would continue to use all the selections of taped music.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>2</td>
<td>3</td>
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<td>5</td>
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</tbody>
</table>

11. I would continue to use only some the sections of taped music.

<table>
<thead>
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<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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</thead>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
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</table>

12. If you circled Agree or Strongly Agree to Q10 or Q11, can you nominate specific activities and specific pieces of music that were beneficial to you and your baby?

…………………………………………………………………………………………………………………………

13. If you circled Strongly disagree, Disagree or Undecided to Q10, can you nominate specific activities and specific pieces of music that were beneficial to you and your baby?

…………………………………………………………………………………………………………………………
For Question 14, circle (a) OR (b) OR (c)

14 (a) A self instruct program of a tape and booklet was very beneficial to me with my baby?

OR

(b) It would have been of equal benefit for me to participate with my baby in a group while being instructed?

OR

(c) A group participation program would have been more beneficial to me with my baby?

15. Was the content of the program Adequate? Too much? Too little?

16. I have benefited from the program in other ways that have not been mentioned in this questionnaire.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
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<td>3</td>
<td>4</td>
<td>5</td>
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</table>

17. If you circled Agree or Strongly Agree, could you describe all the benefits (other than those relating to music) you feel you have gained?

……………………………………………………………………………………………………………………………………………………………………

18. My baby and I together have benefited from the program in other ways that have not been mentioned in this questionnaire.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
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<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>3</td>
<td>4</td>
<td>5</td>
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</table>

19. If you circled Agree or Strongly Agree, could you describe all the benefits (other than those relating to music) you feel you and your baby have gained?

……………………………………………………………………………………………………………………………………………………………………

……………………………………………………………………………………………………………………………………………………………………

20. The activities from the program have increased enjoyable time that my baby and I spend together.

<table>
<thead>
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<th>Strongly disagree</th>
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<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
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<td>4</td>
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APPENDIX 12 CONTINUED

Reliability for the M&M Program Evaluation likelihood type scale items

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<tr>
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a. Listwise deletion based on all variables in the procedure.

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<tr>
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<tr>
<td>mother baby enjoy activities</td>
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### Item-Total Statistics

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<th>Item</th>
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<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
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<td>.573</td>
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### Scale Statistics

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APPENDIX 13

EDINBURGH POSTNATAL DEPRESSION SCALE
EPDS

Mother’s Name………………………………..
Baby’s Age…………………………………...
Date of completing questionnaire……………..

As you have recently had a baby, we would like to know how you are feeling. Please **UNDERLINE** the answer which comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example already completed:

*I have felt happy*

Yes, all the time
Yes, most of the time
No, not very often
No, not at all

This would mean “I have felt happy most of the time during the past week”. Please complete the other questions in the same way.

**IN THE PAST 7 DAYS**

1. **I have been able to laugh and see the funny side of things**
   
   As much as I always could
   Not quite so much now
   Definitely not so much now
   Not at all

2. **I have looked forward with enjoyment to things**
   
   As much as I always did
   Rather less than I used to
   Definitely less than I used to
   Hardly at all

3. **I have blamed myself unnecessarily when things went wrong**
   
   Yes, most of the time
   Yes, some of the time
   Not very often
   No, never
4. **I have been anxious or worried for no good reason**

   No, not at all
   Hardly ever
   Yes, sometimes
   Yes, very often

5. **I have felt scared or panicky for no very good reason**

   Yes, quite a lot
   Yes, sometimes
   No, not much
   No, not at all

6. **Things have been getting on top of me**

   Yes most of the time I haven’t been able to cope at all
   Yes, sometimes I haven’t been coping as well as usual
   No, most of the time I have coped quite well
   No, I have been coping as well as ever

7. **I have been so unhappy that I have had difficulty sleeping**

   Yes, most of the time
   Yes, sometimes
   Not very often
   No, not at all

8. **I have felt sad or miserable**

   Yes, most of the time
   Yes, quite often
   Not very often
   No, not at all

9. **I have been so unhappy that I have been crying**

   Yes, most of the time
   Yes, quite often
   Only occasionally
   No, not at all

10. **The thought of harming myself has occurred to me**

    Yes, quite often
    Sometimes
    Hardly ever
    Never
APPENDIX 14

THE MATERNAL ATTITUDES QUESTIONNAIRE
Below is a series of statements about being a mother. In each case please circle the answers which most applies to you. This questionnaire is seeking your opinion – there are no right or wrong answers.

1. I think my baby is very demanding

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>

2. I feel proud of being a mother

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

3. I am disappointed by motherhood

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
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4. Having a baby has made me as happy as I expected

<table>
<thead>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
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5. I sometimes regret having my baby

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
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</table>

6. I am the only person who can look after my baby properly

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
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7. To be a good mother, I should be able to cope well all the time

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>2</td>
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<td>0</td>
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</table>

8. If my baby is unwell or unhappy it is now my fault

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
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</table>
9. I have resented not having enough time to myself since having my baby

<table>
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<tr>
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<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>2</td>
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10. My daily life has been no more difficult since my baby was born

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<td>0</td>
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<td>2</td>
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11. If I find being a mother difficult, I feel a failure

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
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12. If I love my baby I should want to be with him/her all the time

<table>
<thead>
<tr>
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<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tbody>
<tr>
<td>2</td>
<td>1</td>
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<td>0</td>
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</table>

13. If other people help me look after my baby, I feel a failure

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tbody>
<tr>
<td>2</td>
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</table>

14. I resent the way my life has been restricted since having my baby

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tr>
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APPENDIX 15

PARENTING STRESS INDEX/SHORT FORM
This Questionnaire contains 36 statements. Read each statement carefully. For each statement, please circle the response that best represents your opinion.

YOUR FIRST REACTION TO EACH QUESTION SHOULD BE YOUR ANSWER

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<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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<tr>
<td>1. I often have the feeling that I cannot handle things very well</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>2. I find myself giving up more of my life to my child’s needs than expected</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>3. I feel trapped by my responsibilities as a parent</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>4. Since having my baby I have been unable to do new and different things</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>5. Since having my baby I feel that I am almost never able to do things that I like to do</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>6. I am unhappy with the last purchase of clothing I made for myself</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>7. There are quite a few things that bother me about my life</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>8. Having a child has caused more problems than I expected in my relationship with my partner</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>9. I feel alone and without friends</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>10. When I go out socially I expect not to enjoy myself</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>11. I am not as interested in people as I used to be</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<tr>
<td>12. I don’t enjoy things as I used to</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<tr>
<td>13. My child rarely does things that make me feel happy</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<tr>
<td>14. Most times I feel my child likes me and wants to be close to me</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<tr>
<td>15. My child smiles at me less than I expected</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<tr>
<td>16. When I do things for my baby I feel there is no sense of satisfaction in the task</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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<td>17. When playing my child doesn’t often smile/giggle</td>
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<td>A</td>
<td>NS</td>
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<td>18. My baby doesn’t seem to be developing as quick as other babies his/her age</td>
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<td>A</td>
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<td>SD</td>
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<tr>
<td>19. My baby doesn’t seem to smile as much as most babies his/her age</td>
<td>SA</td>
<td>A</td>
<td>NS</td>
<td>D</td>
<td>SD</td>
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</table>
20. My baby is not able to do as much as I expected
   SA  A  NS  D  SD

21. It takes a long time and it is very difficult
   for my child to get used to changes/new things/routines
   SA  A  NS  D  SD

For statement 22 choose from choices 1 to 5 below
22. I feel that I am:
   1. A very good parent
   2. A better than average parent
   3. An average parent
   4. Having some trouble being a parent
   5. Not a very good at being a parent

23. I expected to have closer and warmer feelings for my child than I do and this bothers me
   SA  A  NS  D  SD

24. Sometimes my child does things that bother me and I feel that it is deliberate
   SA  A  NS  D  SD

25. My baby seems to cry or fuss more often than other babies
   SA  A  NS  D  SD

26. My child generally wakes up distressed/in a bad mood
   SA  A  NS  D  SD

27. I feel that my baby is very moody and easily upset
   SA  A  NS  D  SD

28. My child does a few things, which bother me a great deal
   SA  A  NS  D  SD

29. My baby reacts very strongly when something happens that he/she doesn’t like
   SA  A  NS  D  SD

30. My child gets upset easily
   SA  A  NS  D  SD

31. My baby’s sleeping and eating schedule was much harder to establish than I expected
   SA  A  NS  D  SD

For statement 32 choose from choices 1 to 5 below.
32. I have found that getting my child to do something e.g. sleep, feeding or to stop doing something e.g. crying is:
   1. Much harder than expected
   2. Somewhat harder than I expected
   3. About as hard as I expected
   4. Somewhat easier than I expected
   5. Much easier than I expected

For statement 33 choose from choices 1 to 5 below.
33. Could you count the number of things that your child does that bothers/upsets you. Please circle the number which includes the number you have counted.
   1. 1-3
   2. 4-5
   3. 6-7
   4. 8-9
   5. 10+

34. There are some things my child does that really bother me a lot
   SA  A  NS  D  SD
35. My child turned out to be more of a problem than I expected
36. My baby makes more demands on me than what I can see of other babies
APPENDIX 16

MATERNAL POST-NATAL ATTACHMENT SCALE
AND RELIABILITY RESULTS
These statements concern the different sorts of emotions parents have when caring for young babies. Please tick the response that is closest to your own feelings.

1. When I am caring for my baby, I get the feeling of annoyance or irritation:
   - Very frequently
   - Frequently
   - Occasionally
   - Very rarely
   - Never

2. When I am caring for the baby I get feelings that the child is deliberately being difficult or trying to upset me:
   - Very frequently
   - Frequently
   - Occasionally
   - Very rarely
   - Never

3. Over the last 2 weeks I would describe my feelings for the baby as:
   - Dislike
   - No strong feelings towards the baby
   - Slight affection
   - Moderate affection
   - Intense affection

4. Regarding my overall level of interaction with my baby, I believe I am:
   - Much more involved than most parents in my position
   - Somewhat more involved than most parents in my position
   - Involved to the same extent as most parents in my position
   - Somewhat less involved than most parents in my position
   - Much less involved than most parents in my position

5. When I interact with the baby I feel
   - Very incompetent and lacking in confidence
   - Moderately incompetent and lacking in confidence
   - Uncertain about my confidence
   - Moderately competent and confident
   - Very competent and confident

6. When I am with the baby I feel tense and anxious
   - Very frequently
   - Frequently
   - Occasionally
   - Almost never
   - Never
7. **When I am** with the baby and other people are present I feel proud of the baby:
   - Very frequently
   - Frequently
   - Occasionally
   - Almost never
   - Never

8. I **try to** spend as much time as I possibly playing with the baby:
   - Very frequently
   - Frequently
   - Occasionally
   - Almost never
   - Never

9. **When I have** to leave the baby:
   - I usually feel rather sad (or it’s difficult to leave)
   - I often feel rather sad (or it’s difficult to leave)
   - I am unsure about how I feel
   - I have mixed feelings of both sadness and relief
   - I usually feel rather relieved (and it’s easy to leave)

10. **When I am** with the baby:
    - I always get a lot of enjoyment / satisfaction
    - I frequently get a lot of enjoyment / satisfaction
    - I occasionally get a lot of enjoyment / satisfaction
    - I very rarely get a lot of enjoyment / satisfaction
    - I never get a lot of enjoyment / satisfaction

11. **When I am not** with the baby, I find myself thinking about the baby:
    - Always
    - Almost Always
    - Sometimes
    - Rarely
    - Never

12. **When I am** with the baby I usually try to prolong the time I spend with him/her:
    - Always
    - Almost Always
    - Sometimes
    - Rarely
    - Never
13 When I have been away from the baby for a while and I am about to be with him/her again, I usually feel:
   Intense pleasure at the idea
   Moderate pleasure at the idea
   Mild pleasure at the idea
   No feelings at all about the idea
   Negative feelings about the idea

14. I now think of the baby as very much my own baby
   Always
   Almost Always
   Sometimes
   Rarely
   Never

15. Regarding the things that I have had to give up because of this baby:
   I find that I have extreme resentment
   I find that I resent it quite a lot
   I find that I resent it a moderate amount
   I find that I resent it a bit
   I don’t resent it at all

16. Over the past 3 months (or since the birth of my baby) I have felt that I do not have enough time for myself or to pursue my own interests:
   Always
   Almost Always
   Sometimes
   Rarely
   Never

17. Taking care of this baby is a heavy burden of responsibility. I believe this is
   Very much so
   Somewhat so
   Unsure about this
   Slightly so
   Not at all

18. I trust my own judgement in deciding what the baby needs
   Never
   Almost never
   Occasionally
   Most of the time
   Almost all of the time
19. **Usually when I am with the baby**
   - I am very impatient
   - I am a bit impatient
   - I am unsure about my level of patience
   - I am moderately patient
   - I am extremely patient

---

**Scoring of the scale**

*Item numbers pertaining to the domains and the scoring procedure as advised by Condon and Corkindale are as follows:*

Items in brackets ( ) are reverse scored

**Quality of attachment:** Item Numbers – 3, 4, 5, 6, (7), (10), (14), 18, 19

**Absence of hostility:** Item Numbers - 1, 2, 15, 16, 17

**Pleasure in interaction:** all reversed (8, 9, 11, 12, 13)

To ensure equal weighting of all questions it is recommended that response options be recoded to represent a score of 1 (low attachment) to 5 (high attachment) for every question.
Reliability of Scale

Case Processing Summary

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\(a\). Listwise deletion based on all variables in the procedure.

Reliability Statistics

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Item Statistics

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<th>Std. Deviation</th>
<th>N</th>
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<tr>
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</tr>
<tr>
<td>anticipating seeing baby</td>
<td>4.8333</td>
<td>.56466</td>
<td>96</td>
</tr>
<tr>
<td>accepting baby as own</td>
<td>4.7500</td>
<td>.89685</td>
<td>96</td>
</tr>
<tr>
<td>no resentment</td>
<td>4.5833</td>
<td>.50361</td>
<td>96</td>
</tr>
<tr>
<td>time for self</td>
<td>2.7292</td>
<td>1.22456</td>
<td>96</td>
</tr>
<tr>
<td>not burdened</td>
<td>3.3333</td>
<td>1.33243</td>
<td>96</td>
</tr>
<tr>
<td>trusting own judgement</td>
<td>4.4167</td>
<td>.50361</td>
<td>96</td>
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<tr>
<td>patient with baby</td>
<td>4.4792</td>
<td>.71443</td>
<td>96</td>
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## Item-Total Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
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<tr>
<td>no annoyance</td>
<td>75.8958</td>
<td>40.043</td>
<td>.441</td>
<td>.748</td>
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<td>baby not being deliberately difficult</td>
<td>75.0625</td>
<td>42.572</td>
<td>.212</td>
<td>.762</td>
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<tr>
<td>feelings for baby</td>
<td>74.8125</td>
<td>42.800</td>
<td>.427</td>
<td>.757</td>
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<tr>
<td>quantity of interaction</td>
<td>76.2292</td>
<td>41.956</td>
<td>.338</td>
<td>.756</td>
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<tr>
<td>competence/confidence of interaction</td>
<td>76.1042</td>
<td>38.826</td>
<td>.415</td>
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<tr>
<td>no anxiety with baby</td>
<td>75.9792</td>
<td>43.010</td>
<td>.135</td>
<td>.766</td>
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<tr>
<td>proud of baby</td>
<td>74.9792</td>
<td>41.010</td>
<td>.345</td>
<td>.754</td>
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<tr>
<td>playing with baby</td>
<td>75.0625</td>
<td>41.572</td>
<td>.110</td>
<td>.779</td>
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<td>sadness leaving baby</td>
<td>76.2083</td>
<td>34.020</td>
<td>.815</td>
<td>.708</td>
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<tr>
<td>enjoyment of being with baby</td>
<td>75.2292</td>
<td>41.956</td>
<td>.338</td>
<td>.756</td>
</tr>
<tr>
<td>thinking of baby</td>
<td>75.6875</td>
<td>37.648</td>
<td>.537</td>
<td>.737</td>
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<tr>
<td>time quantity with baby</td>
<td>74.8958</td>
<td>38.434</td>
<td>.529</td>
<td>.739</td>
</tr>
<tr>
<td>anticipating seeing baby</td>
<td>74.8958</td>
<td>40.521</td>
<td>.503</td>
<td>.747</td>
</tr>
<tr>
<td>accepting baby as own</td>
<td>74.9792</td>
<td>38.184</td>
<td>.493</td>
<td>.741</td>
</tr>
<tr>
<td>no resentment</td>
<td>75.1458</td>
<td>40.641</td>
<td>.555</td>
<td>.746</td>
</tr>
<tr>
<td>time for self</td>
<td>77.0000</td>
<td>42.435</td>
<td>.033</td>
<td>.790</td>
</tr>
<tr>
<td>not burdened</td>
<td>76.3958</td>
<td>38.739</td>
<td>.238</td>
<td>.772</td>
</tr>
<tr>
<td>trusting own judgement</td>
<td>75.3125</td>
<td>41.300</td>
<td>.448</td>
<td>.751</td>
</tr>
<tr>
<td>patient with baby</td>
<td>75.2500</td>
<td>42.348</td>
<td>.172</td>
<td>.765</td>
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</table>

## Scale Statistics

<table>
<thead>
<tr>
<th>Mean</th>
<th>Variance</th>
<th>Std. Deviation</th>
<th>N of Items</th>
</tr>
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<tr>
<td>79.7292</td>
<td>44.456</td>
<td>6.66754</td>
<td>19</td>
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</table>
APPENDIX 17

THE ORIGINAL VERSION OF THE MATERNAL POST-NATAL ATTACHMENT SCALE
# The Original version of the MPNAS

## MATERNAL POSTNATAL ATTACHMENT SCALE

<table>
<thead>
<tr>
<th>PM1</th>
<th>When I am caring for the baby, I get feelings of annoyance or irritation:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very frequently</td>
</tr>
<tr>
<td></td>
<td>Frequently</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
</tr>
<tr>
<td></td>
<td>Very rarely</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM2</th>
<th>When I am caring for the baby I get feelings that the child is deliberately being difficult or trying to upset me:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very frequently</td>
</tr>
<tr>
<td></td>
<td>Frequently</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
</tr>
<tr>
<td></td>
<td>Very rarely</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM3</th>
<th>Over the last two weeks I would describe my feelings for the baby as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dislike</td>
</tr>
<tr>
<td></td>
<td>No strong feelings towards the baby</td>
</tr>
<tr>
<td></td>
<td>Slight affection</td>
</tr>
<tr>
<td></td>
<td>Moderate affection</td>
</tr>
<tr>
<td></td>
<td>Intense affection</td>
</tr>
</tbody>
</table>
PM4  Regarding my overall level of interaction with the baby I:

- Feel very guilty that I am not more involved
- Feel moderately guilty that I am not more involved
- Feel slightly guilty that I am not more involved
- I don’t have any guilty feelings regarding this

PM5  When I interact with the baby I feel:

- Very incompetent and lacking in confidence
- Moderately incompetent and lacking in confidence
- Moderately competent and confident
- Very competent and confident

PM6  When I am with the baby I feel tense and anxious:

- Very frequently
- Frequently
- Occasionally
- Almost never

PM7  When I am with the baby and other people are present, I feel proud of the baby:

- Very frequently
- Frequently
- Occasionally
- Almost never
PM8  I try to involve myself as much as I possibly can PLAYING with the baby:

☐ This is true
☐ This is untrue

PM9  When I have to leave the baby:

☐ I usually feel rather sad (or it's difficult to leave)
☐ I often feel rather sad (or it's difficult to leave)
☐ I have mixed feelings of both sadness and relief
☐ I often feel rather relieved (and it's easy to leave)
☐ I usually feel rather relieved (and it's easy to leave)

PM10  When I am with the baby:

☐ I always get a lot of enjoyment/satisfaction
☐ I frequently get a lot of enjoyment/satisfaction
☐ I occasionally get a lot of enjoyment/satisfaction
☐ I very rarely get a lot of enjoyment/satisfaction

PM11  When I am not with the baby, I find myself thinking about the baby:

☐ Almost all the time
☐ Very frequently
☐ Frequently
☐ Occasionally
☐ Not at all
APPENDICES

PM12  When I am with the baby:

☐ I usually try to prolong the time I spend with him/her

☐ I usually try to shorten the time I spend with him/her

PM13  When I have been away from the baby for a while and I am about to be with him/her again, I usually feel:

☐ Intense pleasure at the idea

☐ Moderate pleasure at the idea

☐ Mild pleasure at the idea

☐ No feelings at all about the idea

☐ Negative feelings about the idea

PM14  I now think of the baby as:

☐ Very much my own baby

☐ A bit like my own baby

☐ Not yet really my own baby

PM15  Regarding the things that we have had to give up because of the baby:

☐ I find that I resent it quite a lot

☐ I find that I resent it a moderate amount

☐ I find that I resent it a bit

☐ I don't resent it at all
PM16  Over the past three months, I have felt that I do not have enough time for myself or to pursue my own interests:

☐ Almost all the time
☐ Very frequently
☐ Occasionally
☐ Not at all

PM17  Taking care of this baby is a heavy burden of responsibility. I believe this is:

☐ Very much so
☐ Somewhat so
☐ Slightly so
☐ Not at all

PM18  I trust my own judgement in deciding what the baby needs:

☐ Almost never
☐ Occasionally
☐ Most of the time
☐ Almost all the time

PM19  Usually when I am with the baby:

☐ I am very impatient
☐ I am a bit impatient
☐ I am moderately patient
☐ I am extremely patient
APPENDIX 18

PHOTOGRAPH OF THE TOYS
Photograph of the Toys
The Sheep, The Shoe and The Shark
APPENDIX 19

MOTHER-INFANT/TOODLER PLAY SCALE
MOTHER-INFANT/TODDLER PLAY SCALE

Participant No:…………………
Tape No:……………………..
Coder’s Name:…………………

‘FREE PLAY’ SESSION

MATERNAL UNRESPONSIVENESS TO INFANT’S NEEDS

<table>
<thead>
<tr>
<th>MOTHER</th>
<th>Not at all</th>
<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Holds infant stiffly</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Positions infant without regard for needed support</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Handles infant in abrupt, rough manner or pokes infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Appears oblivious to infant’s needs</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Restricts infants self-directed movements</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Appears detached</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Maternal unresponsiveness subscale score

382
## DYADIC RECIPROCITY

<table>
<thead>
<tr>
<th>MOTHER</th>
<th>Not at all</th>
<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positions infant or herself for reciprocal exchange</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Attends to infant with interest and pleasure</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Talks to infant…pauses…waits for infant response</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Shows pleasure towards infant in gaze, voice and smiles/chuckles</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Makes positive/loving remarks about infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Engages in pleasurable give and take with infant during play</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7. Makes encouraging remarks to infant about play interactions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>8. Appears cheerful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>9. Appears sad</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Mother’s score

<table>
<thead>
<tr>
<th>INFANT</th>
<th>Not at all</th>
<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Looks at mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11. Smiles at mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. Vocalises to mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13. Appears cheerful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14. Plays with mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15. Avoids mother</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

### Infant’s score

\[
\text{Mother + Infant score} = \text{Dyadic Reciprocity Subscale Score}
\]

\[383\]
### MATERNAL INTRUSIVENESS

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shows infant the toys and uses them in a playful manner</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2. Waits for infant to initiate interaction</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. Controls infant’s play without regard for infant’s cues</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Directs infant to do or not to do</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Handles infant excessively during play by using toys</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
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</table>

**Maternal intrusiveness subscale score**

### DYADIC CONFLICT

<table>
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<tr>
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<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Appears agitated</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Appears angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Makes negative remarks about infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Makes negative remarks about infant’s attention to play items</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Mother’s score**

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>A little</th>
<th>Mostly</th>
<th>Very much so</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Appears agitated</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Appears distressed/angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
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</tbody>
</table>

**Infant’s score**

**Dyadic conflict subscale score**
APPENDIX 20

THE ORIGINAL VERSION OF
THE MOTHER-INFANT/TODDLER PLAY SCALE
## Dyadic Reciprocity

### MOTHER

<table>
<thead>
<tr>
<th>Item</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positions infant or herself for reciprocal exchange</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Attends to infant with interest and pleasure</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Talks to infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Shows pleasure towards infant in gaze, voice or smiles</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Makes positive remarks to infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Engages in pleasurable give and take with infant during play</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>7. Makes encouraging positive remarks about infant's play</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>8. Appears cheerful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>9. Appears sad</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### INFANT

<table>
<thead>
<tr>
<th>Item</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Looks at mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11. Smiles at mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12. Vocalises to mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13. Appears cheerful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14. Plays with mother</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15. Avoids mother’s gaze</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Dyadic Reciprocity Subscale Score**
# MATERNAL UNRESPONSIVENESS TO INFANT’S NEEDS

<table>
<thead>
<tr>
<th>MOTHER</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Positions infant without regard for needed support</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Holds infant stiffly</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Positions or holds infant with restriction of normal movement</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Handles infant in abrupt, rough manner</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Appears oblivious to infant’s activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Appears detached</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Maternal unresponsiveness subscale score**
### Dyadic Conflict

<table>
<thead>
<tr>
<th>Item</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Appears distressed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Appears angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Makes negative or critical remarks about infant</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Makes negative or critical remarks about infant’s play</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Mother’s score**

<table>
<thead>
<tr>
<th>Item</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Appears distressed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. Appears angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Dyadic conflict subscale score**

---

### Maternal Intrusiveness

<table>
<thead>
<tr>
<th>Item</th>
<th>None</th>
<th>A little</th>
<th>Pretty much</th>
<th>Very much</th>
<th>Item score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Handles infant excessively</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Shows infant the how to use toys</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Directs infant to do or not to do.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. Controls infant’s play without regard for infant’s cues</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Waits for infant to initiate interactions</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Maternal intrusiveness subscale score**
APPENDIX 21

OPERATIONAL DEFINITIONS (FOR THE REVISED VERSION) OF THE MOTHER-INFANT/TODDLER PLAY SCALE
Operational definitions (for the revised version) of The Mother-Infant/Toddler Play Scale

**Maternal intrusiveness** refers to the mother’s tendency to overstructure, overdirect or overstimulate, interfering

**Child responsiveness** refers to the degree to which the child is visually, vocally gesturally and emotionally receptive to mother’s interactions

**MATERNAL UNRESPONSIVENESS TO INFANT’S NEEDS – Free Play session**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Holds infant stiffly</td>
<td>0 – mother’s arms relaxed,(not stiff) nestles infant, 1 - initial arm stiffness then relaxes, nestles infant 2 – hesitant, arm stiffness, awkward holding eg sits baby on floor 3 - extreme hesitation, arm stiffness, baby held away from mother</td>
</tr>
<tr>
<td>2. Positions infant without regard for needed support</td>
<td>0 - mother fully supports infant’s head when placing infant on floor, gentle in action ensuring infant is comfortable 1 – places infant, head supported but doesn’t attend to comfortable positioning of infant 2 – places infant, head is bumped on floor, mother realises actions e.g. says ‘sorry’ to infant 3 - mother shows no regard for infant’s safety (head unsupport) or comfort</td>
</tr>
<tr>
<td>3. Handles infant in abrupt, rough manner or pokes infant</td>
<td>0 – gentle actions e.g. strokes infant 1 – initially gentle, then become more abrupt, returns to gentle actions 2 – initially gentle, becoming abrupt, continues 3 – shows no gentle action</td>
</tr>
<tr>
<td>4. Appears oblivious to infant’s needs</td>
<td>0 – full attention to infant’s needs 1 – some attention but not overly concerned e.g. says ‘What’s up with you?’ 2 – only concerned with infant’s clothing, e.g turning back cuffs of sleeves 3 – oblivious</td>
</tr>
</tbody>
</table>

**Oblivious** = showing no attentiveness to infant’s emotional and physical needs e.g does not - soothe the infant, stroke infant, wipe infant’s mouth due to reflux, adjust clothing
5. Restricts infants self-directed movements

<table>
<thead>
<tr>
<th>(* denotes ‘Action’ Mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.</strong> Restricts infants self-directed movements</td>
</tr>
<tr>
<td>Such actions include</td>
</tr>
<tr>
<td><em>holds infants hands and feet,</em></td>
</tr>
<tr>
<td><em>pulls arms bringing baby up and down from floor,</em></td>
</tr>
<tr>
<td>*uses baby’s legs as ‘bicycle wheels’, <em>rolls baby side to side</em></td>
</tr>
<tr>
<td>0 – allows freedom of leg and arm movements, responds to infant cues when he/she holds out arms and/or brings up legs. Mother may gently tap feet or hands together then relaxes (‘Play’ mode)</td>
</tr>
<tr>
<td>1 – allows little freedom, uses Play mode</td>
</tr>
<tr>
<td>2 – continually active, oscillates between ‘Play’ and ‘Action’ mode</td>
</tr>
<tr>
<td>3 – no freedom, continually in ‘Action’ mode</td>
</tr>
</tbody>
</table>

6. Appears detached

<table>
<thead>
<tr>
<th>Detached = no use of gentle touch and flowing hand gestures, visual contact and conversation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – attached – uses touch, flowing hands &amp; visual contact to accompany conversations</td>
</tr>
<tr>
<td>1 – slightly detached – uses gestures when chatting but has a moment looking away</td>
</tr>
<tr>
<td>2 – shifting between detached and attached</td>
</tr>
<tr>
<td>3 – detached</td>
</tr>
</tbody>
</table>

**DYADIC RECIPROCITY - Free Play session**

<table>
<thead>
<tr>
<th>MOTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Positions infant &amp;/or herself for reciprocal exchange</td>
</tr>
<tr>
<td>0 – distances herself physically from infant, not interested in making face-to-face exchanges</td>
</tr>
<tr>
<td>1 – positions close to infant for face-to-face, shows hesitation, appears uncomfortable, moves herself about</td>
</tr>
<tr>
<td>2 – shows some hesitation about positioning, then relaxes</td>
</tr>
<tr>
<td>3 – ensures both are comfortable, relaxes – face-to-face contact maintained</td>
</tr>
<tr>
<td>0- loud, abrupt</td>
</tr>
<tr>
<td>1- neutral vocal tone</td>
</tr>
<tr>
<td>2- affectionate tone - speech contouring (prosodic) but has moments of neutral tone</td>
</tr>
<tr>
<td>3 – affectionate vocal tone</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
</tbody>
</table>
| 3. Talks to infant (talking style) | 0 – not at all OR talks ‘at’ infant, not giving infant time for response  
1 - Talks but has moments of silence  
2 – Talks …pauses…but does not include infant, e.g. says what else can I talk about  
3- Talks …pauses…waits for infant response, says e.g. did you like that? “Oh…. is that so” |
| 4. Shows pleasure towards infant in gaze and smiles/chuckles | 0- no gaze, flat facial expression  
1- moments of gaze otherwise distracted or flat  
2- smiles/ laughs but has moments of distraction with gaze  
3 – undistracted- gazes & smiles/laughs |
| 5. Makes positive/loving remarks to infant e.g - aren’t you beautiful, Mummy loves you Hello my darling Aren’t you cute | 0 – makes no comment, or is negative  
1- comments once (but may also be negative)  
2 – comments twice  
3 – more than twice during interaction (no negativity) |
| 6. Makes encouraging remarks to infant about play e.g well done, aren’t you clever, Good boy You are very strong | 0- no encouragement or is derogatory e.g you are just too whiny, you are stinky  
1- some derogatory, some encouraging  
2- no derogatory, 1 to 2 encouraging comments  
3- no derogatory, more than 2 encouraging comments |
7. Engages in pleasurable give and take with infant
‘Attuned’ – mother initiates interactions or responds to infant. Interprets infant’s cues/responds affectionately using hand and touch gestures to match positive vocal intonation, gives time for infant response

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>not attuned</td>
</tr>
<tr>
<td>1</td>
<td>tries engaging with infant but infant not responding, will track infant by following infant’s head turning</td>
</tr>
<tr>
<td>2</td>
<td>mostly attuned with infant, but infant becomes distracted</td>
</tr>
<tr>
<td>3</td>
<td>totally attuned with infant</td>
</tr>
</tbody>
</table>

8. Appears cheerful
Cheerful= happy to be with infant, fully engaged, voice and gestures, positive conversation
Flat= expressionless

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>flat vocal expression and gestures, negative or no conversation</td>
</tr>
<tr>
<td>1</td>
<td>mostly ‘flat’ with moments of cheerfulness</td>
</tr>
<tr>
<td>2</td>
<td>mostly cheerful</td>
</tr>
<tr>
<td>3</td>
<td>fully engaged</td>
</tr>
</tbody>
</table>

9. Appears sad

3 – engaged, show pleasure using vocal intonation, gestures & positive conversation with infant
2- mostly engaged, may have a ‘flat’ moment
1- mostly ‘flat’ with a burst of pleasure
0 – flat vocal expression and gestures, negative or no conversation

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>engaged, show pleasure using vocal intonation, gestures &amp; positive conversation with infant</td>
</tr>
<tr>
<td>2</td>
<td>mostly engaged, may have a ‘flat’ moment</td>
</tr>
<tr>
<td>1</td>
<td>mostly ‘flat’ with a burst of pleasure</td>
</tr>
<tr>
<td>0</td>
<td>flat vocal expression and gestures, negative or no conversation</td>
</tr>
</tbody>
</table>

DYADIC RECIPROCITY

<table>
<thead>
<tr>
<th>Infant</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFANT</td>
<td></td>
</tr>
<tr>
<td>10. Looks at mother (gazes at mother)</td>
<td>0 – turns away, no focus on mother</td>
</tr>
<tr>
<td></td>
<td>1- oscillates head – mainly turns away</td>
</tr>
<tr>
<td></td>
<td>2- may oscillate- mainly focused</td>
</tr>
<tr>
<td></td>
<td>3- fully focused</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>11. Smiles at mother</td>
<td>0- not at all</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Vocalises to mother</td>
<td>0 – silent or may cry</td>
</tr>
<tr>
<td>coos, gurgles, laughs/giggle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Appears cheerful</td>
<td>0 – crying, whimpering</td>
</tr>
<tr>
<td>combine No. 10, 11, 12 – looks, smiles, vocalises</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Plays with mother… extends/reaches out using hand/arm, foot/leg movement,</td>
<td>0 – makes no attempt</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Avoids mother by turning head or shifts eye focus away from mother</td>
<td>3 – always focused</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MATERNAL INTRUSIVENESS**

refers to the mother’s tendency to overstructure, overdirec or overstimulate, interfering

<table>
<thead>
<tr>
<th>MOTHER</th>
<th>3 – No toys used playfully - 'technical' features of toys discussed and/or uses toy for infant to visually track</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shows infant the toys and uses them in a playful manner</td>
<td>2 – 1 toy used playfully</td>
</tr>
<tr>
<td>Playful = imitates animals noises, e.g shark ‘gobbles’, look at the big eyes sheep ‘baas’, oh isn’t it soft</td>
<td></td>
</tr>
<tr>
<td>Puts shoe on foot, look at the sparkles and long laces</td>
<td>1 – 2 toys used playfully</td>
</tr>
<tr>
<td></td>
<td>0 – All toys used playfully</td>
</tr>
<tr>
<td>2. Waits for infant to initiate interaction</td>
<td>3 - Mother talks at infant continually, does not offer toys to infant</td>
</tr>
<tr>
<td>Offers infant toys to hold eg ‘would you like to hold it?’ ‘Mother waits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 – 1 toy is offered</td>
</tr>
<tr>
<td></td>
<td>1 – 2 toys are offered</td>
</tr>
<tr>
<td></td>
<td>0- All toys are offered</td>
</tr>
<tr>
<td>3. Controls infant’s play without regard for infant’s cues</td>
<td>0 – not at all</td>
</tr>
<tr>
<td>Mother controls all use of toys – not released to infant</td>
<td>1 – 1 toys held, 2 released to infant</td>
</tr>
<tr>
<td></td>
<td>2 – 2 toys held, 1 released to infant</td>
</tr>
<tr>
<td></td>
<td>3 – All toys held by mother</td>
</tr>
<tr>
<td>4. Directs infant to do or not to do</td>
<td>0 – 0-1 commands</td>
</tr>
<tr>
<td>Commands = ‘look – your not looking’</td>
<td>1 – 2 commands</td>
</tr>
<tr>
<td>‘look up here at the....’ ‘follow this’</td>
<td>2 – 3-4 commands</td>
</tr>
<tr>
<td>‘don’t chew it’ ‘don’t look over there’</td>
<td>3 – more than 4</td>
</tr>
<tr>
<td>5. Handles infant excessively during play by using toys</td>
<td>0 – none used excessively</td>
</tr>
<tr>
<td>Excessively = Interfering use of toys – tapping on infant’s body continually, placed on face, limbs being ‘gobbled by the shark puppet</td>
<td>1- 1 toy used excessively</td>
</tr>
<tr>
<td></td>
<td>2 – 2 toys used excessively</td>
</tr>
<tr>
<td></td>
<td>3 – all toys used excessively</td>
</tr>
</tbody>
</table>
### Dyadic Conflict

#### Mother

<table>
<thead>
<tr>
<th>1. Appears agitated</th>
<th>0 – relaxed, no signs</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>vocal prosody – interrupted, not smooth and contouring</em></td>
<td>1 – displays all or some behaviours for up to 1 minute</td>
</tr>
<tr>
<td><em>body movement – jerky, not centred to infant</em></td>
<td>2 – displays all or some behaviours for 1-2 minutes</td>
</tr>
<tr>
<td><em>language to infant - eg ‘oh no don’t cry’, ‘don’t do this’ OR shows signs of not being comforting in the use of language</em></td>
<td>3 – displays all behaviours 2-3 minutes of play</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Appears angry,</th>
<th>0 – not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>vocal tone is abrupt, no IDS negative conversation</td>
<td>1 – 1-2 outburst of behaviour (10 secs)</td>
</tr>
<tr>
<td></td>
<td>2 – 3-4 outbursts</td>
</tr>
<tr>
<td></td>
<td>3 – 5+ outbursts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Makes negative remarks about infant</th>
<th>0 – not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>eg You are stinky</td>
<td>1-1-2 comment</td>
</tr>
<tr>
<td></td>
<td>2 – 3-4 comments</td>
</tr>
<tr>
<td></td>
<td>3– 5+ comments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Makes negative remarks about infant’s attention to play items</th>
<th>0 – not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>eg your hopeless your not interested your no looking</td>
<td>1– 1-2 comment</td>
</tr>
<tr>
<td></td>
<td>2 – 3-4 comments</td>
</tr>
<tr>
<td></td>
<td>3– 5+ comments</td>
</tr>
</tbody>
</table>

#### Infant

<table>
<thead>
<tr>
<th>Appears agitated</th>
<th>0 – is cheerful (looks, smiles, vocalises), relaxed body for 3 mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘vocal outburst’</td>
<td>1 – 1 –2 short bursts (approx.10 secs each)</td>
</tr>
<tr>
<td>‘stiffened body’</td>
<td>2 – 3-5 bursts (approx.10 secs each)</td>
</tr>
<tr>
<td></td>
<td>3 – behaviour continues for more than 1 minute</td>
</tr>
<tr>
<td>Appears angry</td>
<td>0 - is cheerful (looks, smiles, vocalises), relaxed body for 3 mins</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Crying with intensity</td>
<td>1 – up to 30 secs</td>
</tr>
<tr>
<td>Thrashing body movements</td>
<td>2 – 30-60 secs</td>
</tr>
<tr>
<td>Eg draws legs up, may push</td>
<td>3 – more than 1 minute</td>
</tr>
<tr>
<td>self with feet on floor</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 22

INTER-RATER RELIABILITY RESULTS OF THE MOTHER-INFANT/TODDLER PLAY SCALE
### Crosstabs - Kappa Total -Initial Assessment

#### Case Processing Summary

<table>
<thead>
<tr>
<th>Cases</th>
<th>Valid</th>
<th>Missing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Percent</td>
<td>N</td>
</tr>
<tr>
<td>Rater1 * Rater 2</td>
<td>448</td>
<td>100.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rater 1</th>
<th>Rater 2</th>
<th>N</th>
<th>Percent</th>
<th>N</th>
<th>Percent</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Missing</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Rater 1 * Rater 2 Crosstabulation

<table>
<thead>
<tr>
<th>Rater 1</th>
<th>Rater 2</th>
<th>.00</th>
<th>1.00</th>
<th>2.00</th>
<th>3.00</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>Expected Count</td>
<td>% within Rater 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td>169</td>
<td>12</td>
<td>31.7</td>
<td>182.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>77.2</td>
<td>37.8</td>
<td>35.3</td>
<td>100.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>34.4</td>
<td>16.8</td>
<td>14.1</td>
<td>81.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.0%</td>
<td>14.8%</td>
<td>66.7%</td>
<td>18.5%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>70</td>
<td>88.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>37.3</td>
<td>18.3</td>
<td>15.3</td>
<td>17.1</td>
<td>88.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>2.3%</td>
<td>15.9%</td>
<td>79.5%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>93</td>
<td>78</td>
<td>87</td>
<td>448.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>190.0</td>
<td>93.0</td>
<td>78.0</td>
<td>87.0</td>
<td>448.0</td>
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<tr>
<td></td>
<td>42.4%</td>
<td>20.8%</td>
<td>17.4%</td>
<td>19.4%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

#### Symmetric Measures

<table>
<thead>
<tr>
<th>Measure of Agreement</th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx.</th>
<th>Approx. Sig.</th>
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---
a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
### Crosstabs- Total Kappa - Second Assessment

**Case Processing Summary**

<table>
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<tr>
<th>Cases</th>
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<td>Percent</td>
<td>N</td>
</tr>
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<td>Rater 2</td>
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**Rater 1* Rater 2 Crosstabulation**

<table>
<thead>
<tr>
<th>Rater 1</th>
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<th>.00</th>
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<th>2.00</th>
<th>3.00</th>
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<tr>
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<td>.0%</td>
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<td>100.0%</td>
</tr>
<tr>
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</tr>
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<td>17.1</td>
<td>18.9</td>
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<td>90.0</td>
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**Symmetric Measures**

<table>
<thead>
<tr>
<th>Measure of Agreement</th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
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<tbody>
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<tr>
<td>N of Valid Cases</td>
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</tr>
</tbody>
</table>

---
a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
APPENDIX 23

COMMUNICATIVE INTENT RATING SCALES

AND

RATERS’ INSTRUCTIONS
**RATERS INSTRUCTIONS**

In this task you will be asked to rate a large number of 25-second speech samples on a series of scales. These scales measure the emotions and intentions mothers can convey to their infants. The speech has been filtered and this means the intonation contour is left intact but the speech is unintelligible.

Your ratings of these samples will be based on qualities expressed in the intonation patterns in the speaker’s voice. Try and focus on the implicit message or tone in each speech sample, as intonation in speech can convey more than one message.

**PLEASE LISTEN CAREFULLY TO EACH SPEECH SAMPLE**

Complete the items by circling one of the marks on the scale.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

**Item 1.** This scale relates to the level of affect or emotion in the speaker’s voice. Affect refers to emotion generally rather than to one specific emotion. Please indicate how much negative (-) or positive (+) affect or emotion is expressed by the speaker on the scale, where 0=none, +4=very high positive affect and -4= very high negative affect.

**Item 2.** These 4 scales relate to the possible intention of the speaker to:
- *Express affection* – an approving tone in the voice
- *Encourage attention* – rising contour of the voice
- *Comfort or soothe* – falling contour of the voice
- *Direct Behaviour* – tone is direct with little use of pausing

Before we start, we will do 6 practice samples provided on the practice samples sheets and you can ask any questions you might have. After this you will have 48 samples of speech to rate. You will have a 3 minute break mid way.

**SAMPLE**

1. **What level of positive or negative AFFECT is expressed by the speaker?**

<table>
<thead>
<tr>
<th>Negative affect</th>
<th>Positive affect</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>+4</td>
</tr>
<tr>
<td>-3</td>
<td>+3</td>
</tr>
<tr>
<td>-2</td>
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<tr>
<td>-1</td>
<td>+1</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

402
2. To what extent is the INTENTION OF THE SPEAKER to

<table>
<thead>
<tr>
<th></th>
<th>EXPRESS AFFECTION</th>
<th>Not at all</th>
<th>Moderate</th>
<th>Extreme</th>
</tr>
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<tbody>
<tr>
<td>(i)</td>
<td>ENCOURAGE ATTENTION</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>COMFORT or SOOTHE</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>DIRECT BEHAVIOUR</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>