ANTENATAL PREDICTORS

OF MATERNAL BONDING FOR

ADOLESCENT MOTHERS

Submitted by

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Abstract

Research studies have found that pregnant adolescents and adolescent mothers differ from their older counterparts on a number of psychological factors. Differences have been noted in the level of antenatal bonding to the foetus, the presence of depressive and/or anxious symptomatology during the pregnancy, the woman's own attachment experiences and the amount of social support received. These variables have also been found to influence the development of maternal bonding after the baby is born.

The primary aim of this research was to examine these antenatal factors and to assess their relative contribution to maternal bonding at six weeks postpartum. A further aim was to explore how different cultural and religious beliefs held by the adolescent and her family impact on the adolescent.

The sample comprised pregnant adolescents aged between 13 and 19 years who attended either the Women's Clinic at Sunshine Hospital or the Young Mothers' Clinic at the Royal Women's Hospital in Melbourne, Australia. The participants completed a number of standardised questionnaires during their pregnancy to measure antenatal bonding, retrospective perceptions of their own experiences of being parented by their mother (care and control), depression, anxiety and social support. The adolescents also participated in a semi-structured interview regarding religious and cultural beliefs. At six weeks and three months postpartum the adolescents completed another set of questionnaires to measure postnatal bonding, depression and anxiety.

The proposed model to predict post-natal bonding was tested using hierarchical multiple regression. Results of the multivariate analyses indicated that the proposed regression model did not fit the data. Antenatal bonding was the only antenatal factor that was significantly related to postnatal bonding at six weeks. There were other significant correlations noted among the antenatal factors of care, control, depression, anxiety and social support received, but none of these appeared to be significantly related to postnatal bonding in this sample. However, strong relationships were noted between all postnatal factors (postnatal bonding, postnatal anxiety and postnatal depression) at both six weeks and three months postpartum.

Information from the interviews on the influence of cultural and religious beliefs was presented and case studies were provided to highlight some of the experiences of these young women.

The results of this research were compared and contrasted to the limited number of previous studies that have been carried out in the area. The lack of support for some hypotheses was discussed in the context of the limitations of the study. Other hypotheses were generated and discussed with recommendations made for future research.

Declaration of Authenticity

I, Simone Elise Cremona, declare that the Doctor of Psychology (Clinical Psychology) thesis entitled Antenatal Predictors of Maternal Bonding for Adolescent Mothers is no more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature:

Date:

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1 Literature Review

1.1 Introduction

Research studies have found that pregnant adolescents and adolescent mothers differ from their older counterparts on a number of demographic, health, obstetric, care-giving, psychological and social factors. These young women are more likely to have an inadequate social support network and be socially isolated (Elster, McAnarney & Lamb, 1983; Quinlivan, Peterson & Gurrin, 1999), have a lack of adequate knowledge of child development and inappropriate child-rearing skills and attitudes (Elster et al., 1983; Leslie, 1996). Often their pregnancies are unplanned and the women are less likely to be in stable relationships (Quinlivan et al., 1999). Furthermore, it has been suggested that the developmental tasks of adolescence may conflict with the responsibility required for caring for a baby (Erickson, 1996).

The negative stereotype associated with adolescent motherhood may have developed as a result of an assessment of the costs and consequences of childrearing at an early age, not just to the adolescent and her infant, but also on a national level. Hoffman (2006) reported that the public cost at a national level of "teen childbearing" to the United States was $ 9.1 billion. The costs are not solely financial, with a number of social issues such as poverty and income disparity, child well-being and welfare, out-of-wedlock births and poor education attainment being linked to early pregnancy and childbearing (The

National Campaign to Prevent Teen Pregnancy, 2007). The implications and consequences of adolescent pregnancy have also been recognised in Australia. Researchers and clinicians such as Quinlivan (2006) have argued that healthcare systems need to provide better information, screening and monitoring for pregnant adolescents. In recent years specific antenatal clinics for adolescent mothers-to-be (e.g. the "Young Mums' Clinic" at the Royal Women's Hospital in Melbourne) have been established in some Australian hospitals in an attempt to better address the needs of this particular group.

This thesis has focussed on psychological features in adolescent pregnancy and motherhood. A review of the relevant available literature is first presented, followed by a description of the current research; detailing aims and hypotheses, methodology, study findings and a discussion of the results.

1.1.1 Prevalence

The National Center for Health Statistics in the United States estimated that in 2002 there were 76.4 pregnancies per 1,000 females aged 15 – 19 years. Of these pregnancies, 56% resulted in live births, 28% in induced abortions and 15% in fetal losses (Ventura, Abma, Mosher & Henshaw, 2006). Ventura et al. compared this data to that reported for previous years and noted a trend towards lower pregnancy rates for this age group over a twelve year period, with the 2002 figures showing a decline of 35% compared to the 1990 statistics. Despite the drop in pregnancy and birth rates for adolescents in the United

States, the proportion of pregnant and childbearing adolescents is still considered to be high when compared to other industrialised countries (The Guttmacher Institute, 2002).

In Australia the pregnancy rate is lower than that of the United States, and considered to be in the "moderate" range (The Guttmacher Institute, 2002). A decline in the number of live births to Australian women aged 15 – 19 years has also been noted. In 2005 the rate of live births for these young women was reported as 16.0 per 1,000 women (Australian Institute of Health & Welfare, 2007). Australian 2006 Census data (Australian Bureau of Statistics (ABS), 2007) reported that 2.2% of all women aged between 15 and 19 years living in Australia had given birth at least once. While more than three quarters of the women only had one child, some had two or more children while still an adolescent. Table 1 shows these statistics, with comparison data available for the State of Victoria, Melbourne Metropolitan area and the Outer Western Melbourne region. These particular statistics were selected as the geographical area of study selected for this research was Melbourne's Western suburbs.

Table 1
Percentage of Adolescent Mothers Aged 15 – 19 Years Compared to Total Adolescent Population in Australia (Source: ABS 2006 Census, 2007)

Location	Total population: women aged 15–19 years	Women aged 15–19 years who gave birth to one or more infants	Percentage of adolescents aged 15 – 19 years who are mothers.
Australia	661, 108	14, 250	2.2%
Victoria	163, 607	2, 249	1.6%
Metropolitan Melbourne	117, 760	1, 225	1.0%
Outer Western Melbourne	19, 880	266	1.3%

These figures show that the percentage of adolescents who are mothers in the state of Victoria is lower than the national percentage. In fact, in the last Census, compared to other states and territories, Victoria was reported to have one of the lowest percentages of adolescent mothers (Australian Bureau of Statistics, 2007). There is also evidence of slight variations within different areas of the Victorian state.

The most recent publication (Laws, Grayson & Sullivan, 2006) from the National Perinatal Statistics Unit (NPSU) provided perinatal data for Australian women and their infants for the year 2004. The document stated that adolescent mothers comprised 4.6% of all Australian mothers (total number of women aged 15 – 19 years who gave birth to one or more infants = 11,541), though this figure also varied widely from state to state. Furthermore, it was estimated that 20.1 per 1000 adolescent women had an abortion in that same year (total number of adolescents who had an abortion = 13, 262).

Comparison between the 1996 and 2006 Census data indicates that the number of children ever born to women aged 15 – 19 years has fallen. However most of the challenges faced by these young mothers remain the same.

1.1.2 Age of Pregnant and Parenting Adolescents

The World Health Organisation (WHO, 1986) defines adolescence as the period of life between the ages of 10 and 19, with adolescence being considered to be the period between childhood and adulthood or maturity. It is important to note that while

adolescence can range across all teenage years studies involving adolescent mothers have set their eligibility criteria to include different age ranges. Furthermore some studies recruit all adolescent mothers, whereas others exclude non-primiparous women who are likely to be older adolescents.

Studies of adolescents in the United States have reported similar mean age, 16.63 years (Kaiser & Hays, 2005) and 16.2 years (Logsdon & Usui, 2006) despite recruiting different age ranges; 15 to 18 years (Kaiser & Hays, 2005) and 13 to 18 years (Logsdon & Usui, 2006). It is worth noting that within the United States a distinction is also made by the National Center for Health Statistics between young adolescents (aged 15 – 17 years) and older adolescents (aged 18 – 19 years), with birth rates for young adolescents reported to be at 2.32% compared to that of 7.28% for older adolescents in the year 2002 (Ventura et al., 2006). However many American studies (Logsdon & Usui, 2006; Stevenson, Maton & Teti; 1999; Stier, Leventhal, Berg, Johnson & Mezger, 1993; Wayland & Tate, 1993) include pregnant adolescents below the age of 15.

Australian studies have generally reported samples that were at the upper end of adolescence consistent with reported pregnancy statistics in this country. Smith and Grenyer (1999) recruited their adolescent participants (reported to be aged 19 years or younger) from a regional area of New South Wales, Australia and reported that more than 50% of the sample was aged 18 years and over and that 68% of the sample was pregnant for the first time. Quinlivan, Tan, Steele and Black (2004) stated that the mean age for the pregnant adolescents (also reported to be aged 19 years or younger) in their Melbourne

study was 17.5 years and this was compared to the average of 18 years for pregnant adolescents throughout the state of Victoria (Australia). Another study carried out in Melbourne (Aiello & Lancaster, 2007) with primiparous women, reported a mean age of 18 years 4 months.

While direct comparisons cannot be made, as not all the studies used primigravida or primiparous adolescents and age ranges of sampled adolescents varied and were not always specified, it would appear that the reported mean age of pregnant adolescents in Australia is slightly higher than that in the United States.

1.1.3 Health and Obstetric Outcomes

Studies comparing adolescent mothers to older mothers have identified health risk factors for the adolescent and her child including higher incidences of cigarette smoking during the pregnancy (Quinlivan et al., 1999; Savona-Ventura & Grech, 1990; Smith & Grenyer, 1999) and alcohol and illegal drug abuse, particularly marijuana (Kaiser & Hays, 2005; Quinlivan et al., 1999). Overseas studies have also reported that adolescent mothers have more frequent miscarriages, a higher likelihood of delivering prematurely, infants with a low birth weight and neonatal morbidity (Australian Institute of Health & Welfare, 2007; Kaiser & Hays, 2005; Savona-Ventura & Grech, 1990).

Despite these serious risk factors and high needs, adolescent mothers-to-be are less likely to get involved with prenatal care and education as shown by poor attendance at

antenatal appointments or being unbooked at the time of delivery (Kaiser & Hays, 2005; Savona-Ventura & Grech, 1990). Rhodes, Fischer, Ebert and Meyers (1993) found that those pregnant and parenting adolescents in their sample who had higher levels of psychological functioning and less economic strain were those who made moderate use of the available social and health services.

1.1.4 Psychological and Social Outcomes

Consistent with overseas studies researchers have also noted that young Australian mothers are more likely to have marked psychological and social problems for which they may require support (Quinlivan et al., 1999; Quinlivan et al., 2004; Savona-Ventura & Grech, 1990; Smith & Grenyer, 1999). However there has been relatively little examination of the effect of psychological factors on the outcomes for Australian pregnant adolescents and their children (Smith & Grenyer, 1999).

Results from Quinlivan et al.'s (2004) Melbourne study which involved a comparison between adolescent mothers and a control group of older mothers, highlighted that early interpersonal relationships (particularly childhood exposure to parental separation or divorce and domestic violence), anxious and depressive symptomatology and idealisation of the pregnancy were associated with an early age of onset of motherhood. The young mothers in this sample were mostly Caucasian, with fewer women from an Asian background; they had a lower educational background, less social support or income, were less likely to be married, reported higher substance use and were more likely to have

"no fixed address or were living in a very unstable household" (p. 199) than their older counterparts.

While studies have reported a higher incidence of unplanned pregnancies among this age group, it has been noted that for some of these women the pregnancy had been planned and wanted. Smith and Grenyer (1999) reviewed literature that indicated in some instances adolescents had become pregnant to resolve problems or to escape from an unhappy family life. This finding corresponds with the concept of "idealisation of the pregnancy" referred to in Quinliven et al.'s (2004) study, where for the adolescent "pregnancy [was] the single most exciting and positive event to have occurred in their lives" (p. 202).

1.1.5 Is Maternal Age the Real Risk Factor?

The issues described earlier have raised queries among various researchers (Elster et al., 1983, Leslie, 1996) as to whether young mothers are able to develop good mothercraft skills and provide adequate childcare. Conclusions have often been reached that rather than maternal age per se being the risk factor, there is in fact great variability among maternal adolescent outcomes and that other demographic and psychosocial factors play a part in determining how successful the transition to motherhood will be. Adolescents who had high self-esteem, no history of physical maltreatment, good social support, were in a stable relation and lived with their parents or partner were considered to have better prospects

(Elster et al., 1983; Milan, Lewis, Ethier, Kershaw & Ickovic, 2004; Smith & Grenyer, 1999).

The need to identify those adolescent mothers-to-be who may be "at risk" due to a variety of demographic and/or psychosocial factors has been reiterated in the conclusion of a number of papers (Elster et al., 1983; Milan, Lewis et al., 2004; Quinlivan et al., 1999; Smith & Grenyer, 1999). Quinlivan et al. pointed out that when providing antenatal care, hospitals often fail to collect an adequate psychosocial history. When this information was systematically collected for research purposes by a team composed of a midwife, obstetric doctor and a social worker, 60% of the sample of Western Australian pregnant adolescents under the age of 17, who were considered to be largely representative of the pregnant adolescent cohort in Western Australia, were identified as having a major psychosocial problem that impacted on their capacity to "carry out acts of daily living" (p. 866). Such issues included social isolation, lack of involvement from the father of the infant, homelessness, the presence of domestic violence and psychiatric problems (particularly emotional and/or conduct disorders).

The presence of these problems and a failure to identify and treat them affects not just the adolescent during pregnancy, but can also influence the woman's ability to adequately parent the child as well as the relationship that the adolescent mother will form with her infant after its birth (Quinlivan et al., 1999). The importance of the formation of a positive relationship between mother and baby as part of an infant's healthy development became the focus of many psychological studies based on "attachment theory".

1.2 Attachment

1.2.1 Origins of Attachment Theory

The focus on attachment over the past four decades has generated thousands of studies addressing various aspects of the concept of attachment and applying that concept to a range of populations. A large number of these studies have clear links to John Bowlby's original theory and Mary Ainsworth's classical studies on attachment. In contrast many others have extended the parameters of Bowlby's theory beyond infant to parent attachment to encompass other significant relationships in later periods of life.

In his 1958 paper "The Nature of the Child's Tie to his Mother", Bowlby drew on a number of ethological concepts, stating that in early infancy, the baby engages in a number of instinctual responses aimed at creating a bond between the infant and his/her mother. According to Bowlby, it is only in the second half of the infant's first year of life that these behaviours begin to be directed to a particular individual, generally a mother figure, thereby displaying signs of attachment. Bowlby described attachment behaviour as:

> any form of behaviour that results in a person attaining or maintaining proximity to some other clearly identified individual who is conceived as better able to cope with the world.
>
> (Bowlby 1988, p. 26-27).

The above definition strongly implies that attachment occurs in the direction of infant towards parent. This definition was also supported by Ainsworth who believed that 'attachment' implied that there was an "experience of security and comfort obtained from the relationship" (Ainsworth, 1989, p. 711). The focus on the uni-directionality of 'attachment' is evidenced by the "strange situation" experiments Ainsworth (Ainsworth, Blehar, Waters & Wall, 1978) conducted in which she demonstrated that young children exhibited different attachment styles which she argued were influenced by early learning experiences. These attachment styles were categorised as three distinct patterns: secure, avoidant and anxious-ambivalent (Bowlby, 1988).

1.2.2 Focus on Attachment Patterns across the Life Span

Bowlby suggested that over time, an infant develops a series of internal representations for the self, the other and interaction based on his/her experience of the relationship with his/her primary caregiver (usually the mother) and referred to this as an "internal working model" (Bowlby, 1988).

Later studies provided some support for this aspect of Bowlby's theory by demonstrating that from infancy there was continuity in the patterns of attachment (Ainsworth, 1989; Fonagy, Steele & Steele, 1991). As attachment theory continued to develop and expand, other aspects and features of the attachment relationship began to be explored. The mental representations of attachment styles were studied in a variety of

relationship settings, and noted to be displayed in close relationships during adult life (Ainsworth, 1989; Bretherton, 1992; Main, Kaplan & Cassidy, 1985).

1.3 Maternal Bonding

1.3.1 The Development of Maternal Bonding Research

Given that the mother was most often considered to be the primary care-giver and therefore the first attachment figure, a related area of research is maternal-infant bonding and its impact on the development of infant attachment (Bretherton, 1992).

Studies examining maternal bonding began to appear in the 1970's (Muller, 1996). Bowlby (1988) had suggested that there were peri- and post-natal conditions that affected the extent of the resultant attachment of the infant, listing observations and studies where those women who had support, both involving practical help such as helping with chores, as well as the availability of emotional support, were able to spend more time with the baby, thereby increasing the possibility of developing a bond. Klaus and Kennell (1982, p. 56) advocated that mother and infant be allowed private contact time to "enhance the bonding experience" soon after the birth, during what they referred to as a "sensitive period" for bonding.

Much of the early research appeared to focus primarily on understanding the infant-mother attachment and tended to only consider the aspect of maternal emotions and behaviours towards the infant in relation to its role in the development of infant-mother attachment (Feldman, Weller, Leckman, Kuint & Eidelman, 1999). However, in her early

attachment studies Ainsworth and her colleagues (Bell & Ainsworth, 1972) had begun to observe interactions between mothers and their infants and referred to the concepts of "maternal sensitivity" and "maternal responsiveness", noting that these were related to the development of an infant's secure attachment.

More recently researchers have argued for the primacy of maternal bonding in that if placed sequentially, the development of emotions, thoughts and behaviours related to the bonding and attachment experience occurs in the parent prior to the development of the infant's attachment to the parent (Williams et al., 1987).

1.3.2 Defining "Maternal Bonding"

While there is consensus that with the birth of a baby, the mother experiences a number of feelings, thoughts and behaviours towards her infant there has not always been consistency in selecting an appropriate term to describe these phenomena. Instead a number of terms have been introduced by different researchers in an attempt to label and study such a construct or some of its aspects. These terms have included "maternal bonding", "mother-infant relationship", "mother-to-infant attachment", "postnatal attachment", "maternal sensitivity" and "maternal responsiveness"; such terms have frequently been used interchangeably within the same paper.

Ainsworth (1989) distinguished clearly between three terms: "relationship", "affectional bond" and "attachment"; with an "affectional bond" referring to a "long-

enduring tie" with a particular person who is irreplaceable, but that does not incorporate the dependency that is additionally characterised by an "attachment". Affectional bonds, including attachments, were considered by Ainsworth to possess a certain longevity, which she did not consider necessarily typical of all relationships. Furthermore, according to Ainsworth, while relationships were dyadic and interactive, affectional bonds arose from the individual and developed as mental representations. Consequently, Ainsworth defined the feeling experienced by the mother towards her infant as an affectional bond and not a relationship or an attachment, reserving the latter for use with infants.

After considering a number of factors that influenced the mother-to-infant relationship, Erickson (1996) proposed the "Erickson Bonding-Attachment process model", in which she also distinguished between maternal bonding and maternal attachment, describing bonding as the process by which attachment occurred, thereby placing maternal bonding as a necessary precursor for maternal attachment.

Conversely, Bretherton, Biringen, Ridgeway, Maslin and Sherman, (1989) chose to use the term "parental attachment behaviour" when referring to the parent, stating that while the term "care giving" is often used when referring to the parent's relationship with the infant, they felt that the latter term did not "sufficiently reflect the depth of the parent-to-child bond" (p. 205). However there was no distinction made in their paper between the terms 'attachment' and 'bonding'.

These definitions show the variation in the conceptualisation of the experiences of new mothers with their infants. Other researchers (Condon & Corkindale, 1998; Muller, 1996; Williams et al., 1987) have also used the terms 'maternal attachment' and 'maternal bonding' interchangeably. However, the original concept of attachment, as proposed by Bowlby and Ainsworth, makes clear reference to the aspect of dependency that characterises an attachment. In recognition of this distinction this study has consistently used the term 'maternal bonding' except when referring to the names of actual measures.

1.3.3 Measuring Maternal Bonding

The measurement of the concept of maternal bonding has also been somewhat problematic, perhaps primarily due to the evident lack of agreement in defining the concept itself.

Maternal behaviours such as "maternal sensitivity" and "maternal responsiveness" have been regarded as aspects of maternal bonding and these have been measured by observation of the mother with her infant (Ainsworth et al., 1978; Elster et al., 1983; Feldman et al., 1999). Different methods have been used to tap into other aspects of maternal bonding such as mental state, thoughts, feelings and representations of the infant (Feldman et al., 1999). Some researchers (Condon & Corkindale, 1998; Muller, 1996; Shin, Park & Kim, 2006) have utilised self-report questionnaires. Bretherton et al. (1989) employed three different methods – observation, interviews and questionnaires – to collect

data at different time points of their longitudinal study while Feldman et al. chose to interview their participants and administer questionnaires.

The use of self-report questionnaires and interviews is particularly effective in instances where subjective information is to be collected. Both Condon and Corkindale (1998) and Muller (1996) considered the emotional bond or tie of affection, referred to as mother-infant or postnatal "attachment" in their studies, to be a "feeling state" (Condon & Corkindale, 1998, p. 60). They postulated that the concept would therefore be better assessed by obtaining information on the mother's personal experiences of her baby than through direct observation.

While maternal-infant bonding has been considered an important area of study, the variety of conceptual definitions currently available and the different measurement methods implemented to investigate it indicate that no operational definition of this particular construct has as yet been established.

As defined by Ainsworth (1989, p. 711), a bond "entail[s] representation in the internal organization of the individual person". The use of observational methods alone would not suffice to measure such an occurrence as observation would fail to capture the experience of thoughts and emotions which may not necessarily be translated into behaviour.

1.3.4 The Relationship between Maternal Bonding and Maternal Age

Elster et al. (1983) reviewed a number of studies that compared adolescent parental behaviour to that of older mothers, in regard to maternal sensitivity, maternal responsiveness and maternal interaction with the infant. It was reported that the quality of the parent to child interaction varied according to maternal age, with adolescent mothers likely to show more physical and less verbal type interaction, as well as being more likely to display negative types of interactions.

Sartore (1996) reviewed literature on 'maternal role attainment' which she described as a process through which a mother adapts to the maternal role and "integrates the mothering behaviours into her established role set, so she is comfortable with her identity of a mother" (p.86). She noted that the majority of findings identified adolescent mothers as being less responsive to infant cues and exhibiting fewer maternal (including bonding) behaviours than older counterparts.

1.3.5 The Importance of Maternal Bonding

Attachment theory has highlighted the benefits of the development of a secure attachment for an infant as well as its impact across the life span. It has been noted however that a child does not display attachment patterns at birth. Rather, the infant exhibits innate behaviours aimed at maximising proximity to a care-giver (Bowlby, 1958; Ainsworth, 1989) and facilitating the development of attachment. It is during the second

half of the infant's first year that s/he begins to exhibit more specific attachment behaviours.

Such attachment behaviours are considered to be a result of a number of conditions (Bowlby 1988), and differences in resultant infant attachment behaviours have been linked to maternal sensitivity and maternal responsiveness, with mothers who respond sensitively being more likely to have infants who develop a secure attachment (Bell & Ainsworth, 1972; Elster et al., 1983; Feldman et al., 1999). Conversely, those women who engage in poor maternal care practices, who are less sensitive towards their infant or who have a poor bonding experience with their infant, are more likely to have infants classified as insecurely attached (Ainsworth, 1989; Bretherton, 1992; Feldman et al., 1999). The importance of developing a healthy bond and good maternal care practices early in the infant's life is indicated by Lounds, Borkowski, Whitman, Maxwell & Weed (2005) who reported that in a sample of adolescent mothers, the measure of the quality of parenting during infancy related to a child's attachment at five years, over and above the concurrent measure of maternal responsiveness.

Studies that have specifically examined the attachment of infants and young children of adolescent mothers have noted the considerable difference in the attachment styles compared to norms reported for low-risk, Caucasian, middle-class US samples (Broussard, 1995; Lounds et al., 2005). Such research has reported that children of adolescent mothers are more likely to be classified as insecure or disorganised and less likely to be classified as secure. These findings have not always been replicated in other

studies. Ward and Carlson (1995) reported variation in attachment classification across the adolescent mother-child dyad population but did note however, that attachment representations of pregnant adolescents predicted maternal sensitivity and infant-mother attachment, while Hubbs-Tait et al. (1996) reported that attachment representations of children of adolescent mothers at 44 months postpartum predicted externalising behaviour problems ten months later.

Consequently, it has been suggested that poor maternal-infant bonding can potentially lead to some form of child maltreatment (Bloom, 1995; Milner, 1994; Williams et al., 1987). Stier et al.'s (1993) study indicated that child maltreatment, particularly neglect was at least twice more likely to occur with younger mothers, and that infants of adolescent mothers were four times more likely to experience changes in their caretaker, the latter also being attributed to the chaotic social environments these young mothers frequently found themselves in. However, Lesser, Koniak-Griffin and Anderson, (1999) suggested that maternal age is not necessarily the risk factor, but that abuse was more likely to occur when there was a combination of chronic depression, social isolation, and concurrent unrealistic expectations for the child's behaviour.

In summary, maternal bonding has been shown to occur prior to the development of infant attachment (Condon & Corkindale, 1998; Erickson, 1996; Williams et al., 1987) and a positive association between maternal bonding and infant attachment has been established (Bell & Ainsworth, 1972; Elster et al., 1983; Feldman et al., 1999). Further understanding of the factors that influence maternal bonding is still required.

1.4 Factors Affecting Maternal Bonding

> Some women undoubtedly have formed a model of themselves in relation to an infant perhaps even long before the infant is conceived. These women are primed to bond to their infants.
>
> (Ainsworth, 1989 p.712)

There are a number of factors occurring both during and after pregnancy that may influence the bond a woman may develop with her baby. The following sections explore some of the literature that is available on psychological factors that impact on maternal bonding, with a particular emphasis on antenatal aspects. Studies have chosen to focus on a number of different variables sometimes singling out one individual variable for detailed examination, or alternatively testing a range of variables to measure predictive ability. Findings from these latter studies often highlight variables that warrant further investigation.

A model including direct and indirect relationships with postnatal bonding was proposed and tested with a sample of women with low obstetric risk at one month and eight months postpartum (Mercer & Ferketich, 1990). Variables such as anxiety, parental competence, received support, antenatal bonding, marital status and mother's own relationship with her mother as a child explained 41% of the variance in postnatal bonding at one month postpartum; while anxiety, parental competence, family functioning, perceived support, first holding of the baby, mother's own relationship with her mother as a

child and negative life events explained 53% of the variance in postnatal bonding at eight months postpartum. In her study of antenatal and postnatal bonding, Muller (1996) also suggested in her discussion that while a relationship between the two variables existed, other factors such as the woman's maternal representations of attachment; her own attachment experiences or her psychological status may also impact on bonding at both the antenatal and postnatal stage.

The psychological factors selected for investigation in the current study included maternal foetal bonding, the adolescent's own experience of upbringing, depression, anxiety, and social support. It will be noted throughout the review that these factors have been reported to influence mothering behaviours and maternal bonding. As with many other social and psychological variables they do not occur in isolation, but rather tend to be co-related, as specifically noted by some researchers (Mercer & Ferketich, 1990; Muller, 1996; Slade, Belsky, Aber & Phelps, 1999).

1.4.1 Maternal Foetal Bonding

Many authors have referred to the idea that parental bonding begins during pregnancy (Condon, 1993; Erickson, 1996; Klaus & Kennell, 1982; Muller, 1996; Williams et al., 1987). As the pregnancy progresses most women think about and experience emotions relating to the baby growing inside them. Antenatal bonding was considered important for the woman to be able to adapt to and experience the pregnancy (Klaus & Kennell, 1982).

Erickson (1996) described 'maternal foetal attachment' as beginning when the woman first feels connected to the foetus. The development of maternal foetal bonding has been said to occur through the mother's cognitive representations of the unborn baby, which in turn may be manifested in a number of behaviours (Salisbury, Law, LaGasse & Lester, 2003).

A number of variables have been reported to be associated with maternal antenatal bonding. Condon and Corkindale (1997) found that pregnant women in their third trimester who reported low levels of maternal-foetal bonding had higher levels of depression and anxiety, and low levels of social support. Gestation has consistently been found to be positively associated with foetal bonding, as the mother's internalised image of the unborn baby develops and becomes more elaborate over the course of the pregnancy (Condon, 1993; Lindgren, 2001; Salisbury et al., 2003; Wayland & Tate, 1993). In a review of 25 longitudinal studies most (80%) reported significant findings relating to increased maternal foetal bonding across the gestational period (Cannella, 2005).

Condon (1993) emphasised the importance of identifying parent-to-foetal bonding, stating that this allowed for the study of maternal bonding "uncontaminated" (1993 p. 168) by postnatal conditions. However, previous studies that have examined the relationship between prenatal and postnatal bonding have produced conflicting results (Cannella, 2005; Muller, 1996). Some longitudinal studies conducted with adults and adolescents have demonstrated a significant relationship between prenatal and postnatal bonding (Bloom,

1995; Muller, 1996; Williams et al., 1987). Having developed her own measures for antenatal and postnatal bonding, Muller found that there was a moderate correlation between the two variables, and regression analysis determined that prenatal bonding (measured toward the end of the pregnancy) explained 17% of the maternal bonding scores (measured in the first two months after delivery). In Shin et al.'s (1996) study with adult mothers, maternal-foetal bonding measured retrospectively within six weeks after birth was the strongest predictor of maternal sensitivity, accounting for 31% of the variance. Yet Mercer and Ferketich (1990) found that foetal bonding only predicted maternal bonding directly during the early postpartum period, particularly for women in a lower socio-economic status, thereby concluding that antenatal bonding was not necessarily related to maternal bonding towards the infant.

Condon (1993) attributed some of the inconsistency in the findings to a lack of good questionnaires available to measure antenatal bonding, rather than an absence of a relationship between the two variables. Other reasons for variations in the results are possibly due to differences in the design of the studies and the different time points at which the data was collected. Furthermore, studies that have examined postnatal bonding and included other variables in addition to antenatal bonding have shown that the model is indeed a complex one (Mercer & Ferketich, 1990; Muller, 1996) with a number of factors at play that influence the development of bonding both directly and indirectly.

1.4.2 Maternal Representations of Early Childhood Experiences

As noted previously it has been shown that attachment styles are not only stable over time but that patterns of attachment styles are transmitted across generations (Bretherton, 1992) – that is to say that a woman's own attachment experiences while growing up will influence the way she interacts with others in later life, including the way she will relate to her own infant. The implication is that the way a mother parents her child will largely be a reflection of her own early childhood experience of being parented. Based on the concept of the internal working model proposed in Bowlby's attachment theory, it can be argued that

> a woman, even prior to parenthood, knows the maternal role from experiences with her own mother, and … she will play out that role, replicating the pattern of the parent-child relationship with her own children.
>
> (Crowell and Feldman, 1991, p. 597).

To assess whether attachment patterns are replicated across generations, researchers have utilized measures such as the Adult Attachment Interview, devised by Mary Main and her colleagues, to classify a person's attachment style, based on coherence of responses to a number of questions related to their childhood relationships. The person's attachment classification is then correlated to observations of their current behaviour and/or their

infant's attachment style, the latter often measured through use of Mary Ainsworth's Strange Situation experiment.

Slade et al. (1999) assessed and examined links between mothers' representations of attachment and their parental representations of their relationship with their children as well as observing their mothering in the home. The results indicated that those mothers who were classified as being "secure" on the Adult Attachment Interview, were more likely to describe experiencing joy and pleasure in their relationship with their infant than those mothers classified as being "dismissing" or "preoccupied". Furthermore those parents who described joy and pleasure in their relationship displayed more positive mothering toward their infant when observed in the home. However mental representations of attachment styles did not predict positive parenting in this research and the links between the representation of attachment styles for insecure mothers and parental representations of the child were not as clearly indicated. Slade et al. suggested that the lack of significant relationships between all three variables could be due in part to the use of naturalistic observations conducted in the home and that representations of early attachment experiences did not function alone in shaping a mother's representations of the relationship with her child.

Using a laboratory-based separation-reunion procedure Crowell and Feldman (1991) considered the relationships between a mother's representations of attachment (measured by the Adult Attachment Interview) and maternal and child behaviours. Their

results indicated associations between the mothers' attachment classifications (secure, dismissing or preoccupied), their behaviour and that of their children.

Studies also exist showing direct links between a mother's maternal representations of attachment relationships and her infant's attachment style. Main et al. (1985) noted that parents' recollections of attachment relationships in their own childhood measured via the Adult Attachment Interview were associated with their infants' attachment patterns. In a similar study Fonagy et al. (1991) assessed mothers' childhood attachment experiences during pregnancy and then measured infant-attachment when the infants were around a year old; results indicated a 75% predictive rate between maternal representation of early attachment relationships and subsequent infant attachment.

There have been no specific studies that have addressed the relationship between an adolescent mother's representations of attachment relationships and her infant's attachment style. However there have been some studies that have considered the impact of childhood experiences in general on the maternal-infant bond in adolescent mothers.

1.4.2.1 Adolescent Mothers and Recollections of Childhood Experiences

While not directly assessing attachment styles, some studies have indicated the influence of childhood experiences on adolescent mothers and their ability to create a positive relationship with their own children. Quinlivan et al. (2004) found that adverse early life experiences were the strongest indicator of younger maternal age. When

compared to older mothers, adolescent mothers reported more instances of negative or absent relationships with either their mother or father, as well as less positive relationships between their parents. Among the adolescent mother sample there were also more reports of childhood exposure to a violent parental relationship, or childhood (under 5 years) experiences of parental separation or divorce.

Considering the evidence for the transmission of attachment styles from parents to children previously described, the relatively high incidence of such negative early life events for adolescent mothers has raised queries about how such experiences may influence the way that an adolescent mother may relate to her own child. Milan, Lewis et al. (2004) reported that a pregnant adolescent's experience of physical maltreatment as a child influenced the relationship she subsequently developed with her own infant after birth. Adolescent mothers who had experienced greater physical violence were more likely to also experience less enjoyment when interacting with their child, feelings of parental role incompetency and greater disappointment in infant responsiveness. The relationship between a history of physical maltreatment and mother-infant relationship difficulty was mediated by the pregnant adolescent's representation of a caregiver; the latter measured by assessing an adolescent's evaluations of the relationship with their primary caretaker and general feelings she associated with motherhood during her pregnancy. McCollough and Scherman (1998) specifically examined the potential of adolescent mothers to abuse their child and found that those adolescents who perceived low levels of family cohesion, generally also scored higher on the potential to abuse their own offspring. In contrast when

an adolescent had felt accepted and supported by her own parents, she was better able to build her own "positive identity of a mother to her child." (p. 380).

So far maternal foetal bonding and maternal representations of own childhood experiences have been considered as potential variables influencing maternal infant bonding. However, mental representations of bonding (both past and present) are not the only factors that have been suggested to affect maternal bonding. The next sections explore the literature available in regard to the influence of psychological wellbeing (including depression and anxiety) on postnatal bonding.

1.4.3 Depression

The presence of a mood disorder such as depression is characterised by low mood and/or a loss of interest or pleasure, but may also include other symptoms such as weight loss or gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or inappropriate guilt, diminished ability to think or concentrate, and recurrent thoughts of death or suicidal ideation (American Psychiatric Association, 2000). Mood disorders can occur at any stage of life but in the last few decades there has been an increase in research focussed on maternal depression that occurs following the birth of a child.

Postnatal depression (PND) has been said to affect 12% to 15% of childbearing women and sometimes impacts on a woman's ability to carry out her maternal role

effectively (Pope, 2000) or limits a mother's capacity to develop a bonding relationship with her infant (Feldman et al., 1999). There are a number of well-established screening questionnaires, (such as the Beck Depression Inventory and the Hospital Anxiety and Depression Scale) that were developed to identify possible cases of depression in general populations. Some authors however, challenged the predictive value of such questionnaires when used in the perinatal period as some of the somatic symptoms usually linked with depression may be caused by physiological changes associated with childbearing (Cox, Holden & Sagovsky, 1987; Pope, 2000). For this reason a screening questionnaire specific to the postpartum stage – the Edinburgh Postnatal Depression Scale (EPDS) - was devised by Cox et al. (1987). The EPDS is now used widely for screening women in primary care settings and in research studies examining the prevalence of PND and factors associated with PND.

Many studies have sought to identify factors that might contribute to women developing PND. Results have indicated a range of factors including a previous history of depression (Pope, 2000; Webster et al., 1994), antenatal depression (Heron et al., 2004), maternal adjustment (Webster, Thompson, Mitchell & Werry, 1994), a poor marital/partner relationship (Webster et al., 1994) and low social support (Brage et al., 2000; Logsdon et al., 2002). A study conducted in New Zealand (Webster et al., 1994) measured women's scores for depression using the EPDS and correlated these scores with a range of demographic and maternal adjustment and attitude factors at four weeks postpartum. Specifically, the maternal adjustment and attitude factors referred to the level of confidence and enjoyment obtained in caring for the infant and the presence of a positive attitude

towards the baby. Factors that were significantly associated with an increased likelihood of depressive symptoms included an unhappy relationship with one's partner, a younger maternal age, being a single parent, or having a previous psychiatric hospitalisation. The study also reported a strong correlation ($r = 0.56$. $p = 0.0001$) between depression scores and the maternal adjustment and maternal attitude scores.

There has also been a particular interest in determining whether the presence of depression in pregnancy may contribute to PND. A detailed review (Pope, 2000) reported that despite the fact that some studies have found little association between antenatal and postnatal depression, most of the evidence indicated that a woman who is depressed during pregnancy is more likely to develop postnatal depression. Heron et al. (2004) found moderate stability between antenatal (18 weeks gestation) and postnatal (8 months postpartum) depression scores on an individual basis, despite a mean decrease in symptoms from the antenatal to postnatal stages. It has been noted that such depression scores need to be understood together with other factors which may also pose risk such as a history of depression, a history of abuse during childhood, cultural differences, differences in availability of social support and birthing and post-birth conditions (Austin & Lumley, 2003; Pope, 2000).

While studies have reported strong associations during the postnatal period between depression and maternal adjustment and maternal attitude scores (Webster et al., 1994) and a relationship between postnatal depression and postnatal bonding (Condon & Corkindale, 1998), correlations of similar variables with antenatal depression were not as definitive.

Condon and Corkindale (1997) reported that low antenatal bonding scores were related to high levels of antenatal depression in a sample of women in the third trimester. Lindgren (2001) collected data from women with a gestational age between 20 and 40 weeks and found that after controlling for demographic factors (including age, income and education) depression made an independent contribution to maternal foetal bonding. In contrast, Honjo et al. (2003) who obtained data from their sample in the first two trimesters did not find a relationship between depression and antenatal bonding.

1.4.3.1 Adolescent Mothers and Depression

Quinlivan et al.'s (2004) study of adolescent mothers examined depression, with results showing that scores on the depression subscale were significantly higher for adolescent mothers than for their older counterparts. However, multivariate analysis revealed that while depression remained significant, other factors were identified as having stronger associations with the likelihood of younger aged motherhood. These factors included childhood exposure to parental separation or divorce under the age of 5, childhood exposure to domestic violence, illicit drug use, idealisation of the pregnancy and a low family income.

Many studies have found that pregnant adolescents and adolescent mothers have higher scores on depression scales (Barnet, Jofffe, Duggan, Wilson, & Repke, 1996; Lesser et al., 1999; Pope, 2000; Quinlivan et al., 2004) and are at a higher risk for depression than older mothers (Brage Hudson, Elek, & Campbell-Grossman, 2000). However, when

emotional distress scores (measuring depression, anxiety and hostility) for pregnant and parenting adolescents were compared with scores of nulliparous adolescents coming from a similar background, there were no significant differences in distress levels (Milan, Ickovics et al., 2004). It is possible to speculate that depressive symptomatology is not directly associated with a young maternal age, but that the symptoms are a product of other factors. Specifically, Milan, Ickovics et al. found that a history of physical maltreatment, socio-economic stressors and limited partner support all influenced the likelihood of reporting ongoing emotional distress for pregnant and parenting adolescents.

Some factors may lead to depressive symptomatology prior to pregnancy among adolescents, raising a query as to whether adolescent mothers are in fact at a higher risk than nulliparous adolescents. However, pregnancy and the subsequent birth of a baby are likely to place an adolescent mother in a different position to that of non-childbearing peers. Clemmens' (2002) qualitative study with adolescent mothers who had experienced depressive symptoms since the birth of their baby elicited a number of themes. Reasons for feeling depressed included feeling different and scared with the realisation of changed circumstances, feeling divided between the roles of adolescence and motherhood, feeling alone and abandoned by partners and peers, not understanding the emotions elicited by the depression and being unable to manage them.

Conversely, for some adolescent women, depressive symptoms existing during the pregnancy decreased temporarily from the third trimester until around three months postpartum, before increasing again slightly (Milan, Ickovics et al., 2004). This decrease in

symptoms was explained as possibly occurring in the context of positive emotions surrounding the birth of the baby and an increase in attention from a support network. In a sample of adolescents who reported antenatal or postpartum depressive symptoms, Lesser et al. (1999) found that for some of these participants, becoming a mother helped to ameliorate their life situation and was an incentive for them to change their previous lifestyle. Nevertheless the researcher also noted that those who suffered from a chronic depressive mood together with other debilitating factors such as social isolation after the baby's birth would be more likely to engage in problematic maternal behaviours.

In contrast to the focus on depression in both adults and adolescent mothers, there has been less attention to anxiety in pregnancy and the early parenting period.

1.4.4 Anxiety

Anxiety has been shown to occur among pregnant women but due to its co-morbidity with depression, anxiety is sometimes not well-differentiated from depressive emotions, or may be confused with normal adjustment to the pregnancy (Pope, 2000). Furthermore, anxiety during pregnancy may go undetected because the symptoms present may not be severe enough to warrant an anxiety disorder diagnosis. Women suffering from anxiety may not satisfy the conditions necessary to warrant a diagnosis of an anxiety disorder, but the DSM-IV-TR (American Psychiatric Association, 2000) reported that women diagnosed with postpartum depression often also have "severe anxiety and even Panic Attacks" (p. 423).

The co-morbidity between depressive and anxious symptoms during pregnancy and the early post-partum stage have raised challenges for measurement (Jomeen & Martin, 2004), and perhaps for this reason, the study of antenatal anxiety has often been neglected (Heron et al., 2004). Anxiety symptoms were reported to appear more frequently in association with depression occurring among childbearing women (both during pregnancy and postpartum) than with other forms of depression (Ross, Gilbert Evans, Sillers & Romach, 2003). While situational anxiety during pregnancy was reported by the participants, particularly during the last weeks of the pregnancy, the high co-morbidity found between anxiety and depression during pregnancy and the postnatal period has led researchers to question whether anxiety and depression should still be considered as two separate disorders during the postpartum period. In fact, it has also been suggested that some measures of perinatal and postnatal depression, such as the EPDS, are also sensitive to the presence of anxiety features (Ross et al., 2003). Some researchers such as Milan, Ickovics et al. (2004) have chosen instead to measure a more general emotional state, including depression, anxiety and hostility incorporated as one factor of emotional distress.

Those researchers who have chosen to measure anxiety as a separate variable to depression have sometimes distinguished between trait anxiety (stable, generalised anxiety proneness) and state anxiety (situation-specific) in their studies. Feldman et al. (1999) reported that maternal trait anxiety was related to a higher level of preoccupation, with women reporting increased frequency of thoughts and worries about their infants, increased level of distress, and a reduced ability to manage their distress. Mercer and Ferketich

(1990) focused primarily on state anxiety, finding that for low obstetric risk adult women, state anxiety explained 19% of the variance in maternal bonding during the early postpartum phase, and that in turn, mastery and parental competence explained 45% of the variance in state anxiety.

Similarly to depression, antenatal anxiety has also been found to be moderately stable between pregnancy and postpartum (Heron et al., 2004). Furthermore antenatal anxiety, particularly in late pregnancy has been shown to be predictive of postnatal depression, even after controlling for antenatal depression (Heron et al., 2004).

1.4.4.1 Adolescent Mothers and Anxiety

Few studies appear to have focused specifically on the measurement or examination of trait and/or state anxiety among pregnant and parenting adolescents. As mentioned earlier, Milan, Ickovics et al. (2004) compared levels of emotional distress, which included anxiety symptoms, in a sample of nulliparous and pregnant/parenting adolescents, and found no significant differences in the level of emotional distress among the two groups.

However Mercer and Ferketich's (1990) finding that a sense of mastery and parental competence indirectly influence maternal bonding, by being negatively correlated with state anxiety, may raise questions as to whether pregnant and parenting adolescents are more likely to experience anxiety about the role of motherhood than their adult counterparts. This hypothesis may arise as adolescent pregnancies are more likely to be

unplanned (Quinlivan et al., 1999) and adolescent mothers are often considered to be less prepared for the new role ahead of them (Elster et al., 1983; Erickson, 1996; Sartore, 1996).

Adolescent mothers have been shown to have significantly higher anxiety scores when compared to mothers aged over 20 (Quinlivan et al., 2004). As with depression, the presence of anxiety remained a significant factor even when included with other variables in a multivariate analysis to assess the association of various factors with the likelihood of an early age of onset of motherhood. Its relative contribution was higher than that of depression but lower than some of the other variables, including childhood exposure to parental separation or divorce before five years of age, childhood exposure to domestic violence, illicit drug use, idealisation of pregnancy and low family income. Despite the higher depression and anxiety scores obtained by adolescent mothers in this study, the authors noted that very few of the adolescents had received psychiatric or psychological assistance.

One factor that may serve to buffer the effects of psychological symptoms such as anxiety and depression is the presence of support from others.

1.4.5 Availability of Social Support

Social support has been identified as a complex construct, involving a number of categories, rather than simply being the presence of a social interaction (Hupcey, 1998). It has been distinguished from professional or paraprofessional support both in terms of

definition and in measurement of outcome (Logsdon & Davis, 2004). Based on Hupcey's earlier conceptualisation, social support was defined by Logsdon, Birkimer, Ratterman, Cahill K. and Cahill N. (2002) as the

> well intentioned action that is given willingly to a person with whom there is a personal relationship and that produces an immediate or delayed positive response in the recipient (p. 76).

The complexity of the concept of social support can be considered in terms of the nature of the support, the expectations vs. availability of social support and the providers of social support. Various categories of social support, e.g. material, emotional informational and comparison support have been identified (House, 1981; Logsdon & McBride, 1989). Importantly it has been noted that satisfaction with the social support provided is influenced by the receiver's expectations and their perception of the availability of the support (Hupcey, 1998).

Social support during pregnancy and parenting has generated a lot of interest among researchers perhaps because of its potential to act as a buffer from the difficulties faced during this time. Mercer and Ferketich (1990) stated that in the early postpartum period, received support had direct positive effects on maternal infant bonding, while perceived social support played a more significant influence on the bonding relationship at eight months postpartum. Furthermore, social support also influenced bonding indirectly during the early postpartum stage by its negative relationship with state anxiety. Milan, Lewis et

al. (2004) reported that a supportive relationship with a romantic partner moderated the influence a history of maltreatment has on the adolescent mother-infant relationship, but unlike Mercer and Ferketich these authors did not find a direct relationship between partner support and the mother-infant relationship. Supportive relationships have also been noted to be negatively related to factors such as depression (Brage et al., 2000) and emotional distress (Milan, Ickovics et al., 2004) in the postpartum period.

Who the social support is provided by has been shown to be important in terms of the influence of social support on outcomes.

1.4.5.1 Adolescent Mothers, Relationships and Social Support

Logsdon et al.'s (2002) review observed that previous studies had found that the persons most likely to provide social support to adolescent mothers were their own mothers and the father of the baby. It was noted that the adolescent's mother was most likely to provide informational and material support as well as child care. In contrast, the father of the baby was more likely to provide emotional support, which was found to increase self-esteem in the adolescent, particularly if the relationship was considered to be 'high quality'. While peers were at times nominated as providers of emotional support (Richardson & Barbour, 1991) it was also noted that the pregnancy and the new maternal role at times isolated the new mother from her friends.

However the two figures that were likely to provide the most support – her mother and her partner – were also found to be the most common source of conflict for the adolescent (Barnet et al., 1996; Rhodes, Ebert & Meyers, 1994). Richardson and Barbour (1991) referred to the phenomenon as "bittersweet connections" and stated that support and interference were likely to occur simultaneously, rather than appearing as extremes on the same continuum. It has been noted that this tension between support and interference is likely to occur in situations where the young mother is struggling to assert her independence while at the same time being dependent on her parents for assistance and support (Logsdon et al., 2002; Richardson & Barbour, 1991).

A recent Australian study (Quinlivan et al., 2004) found that social support was less available to adolescent mothers than the older women in the control group. While all of the mothers in the control group could identify at least one person to provide support, with the majority identifying three or more people, 15% of adolescent mothers stated that they had no other person to depend on, and a further 15% identified the father of the baby as the only support. In an earlier study, Quinlivan et al. (1999) found that social isolation and a lack of support from family and friends was reported by 46% of an Australian sample of adolescent mothers, with 16% identified as homeless, and 22% having experienced domestic violence.

The availability of social support impacts on psychological factors too. In the previously cited review of social support in pregnant and parenting adolescents (Logsdon et al., 2002) the authors concluded that the availability of appropriate social support was associated with positive outcomes such as adolescent well-being and a positive bond to the

infant, while inadequate support was associated with depression. A meta-analysis based on 13 studies that measured the relationship between the availability of social support and adolescent mothers' interactions with their infants found a moderate correlation between the two variables (Clemmens, 2001). It was noted that it was particularly important that the support provided specifically addressed the adolescent's needs at the time so as to most effectively influence the maternal interactions of these women with their infants. Similarly, Colletta and Gregg, (1981) found that the amount of social support available to the adolescent mother was positively correlated with the frequency of appropriate maternal behaviour, particularly if the received emotional support was from the adolescents' family of origin. Brage et al. (2000) reported a strong negative relationship between social support and depression during the postpartum stage and between social support and loneliness.

Conversely, Rhodes et al. (1994) considered how social networks were not always a source of support, but that problems within the relationships, such as intrusiveness, criticism, conflict and disappointment, were related to decreased psychological functioning. Milan, Lewis, Ethier, Kershaw and Ickovics (2005) studied the impact of relationship violence (both male- and female-enacted) on adolescent mothers and compared it to relationship violence for nulliparous adolescents from the same community. It was noted that while the frequency and patterns of dyadic violence did not vary according to parental status, the consequences differed, with adolescent mothers less likely to end the relationship and more likely to experience an increase in depression.

The importance of the perceived availability of social support during the antenatal stages has been also reported (Condon & Corkindale, 1997; Wayland & Tate, 1993). Condon and Corkindale found that low levels of social support affected the development of maternal antenatal bonding. Again the importance of the availability of social support was particularly evident when the support was provided by the adolescent's mother and/or the baby's father. In such cases the antenatal bonding scores were moderately correlated with how close the pregnant adolescent felt to the providers of social support. A significant association was also found between adolescent parents-to-be who reported that they had experienced poor relationships with, or rejection from, their own parents during childhood and their current social integration (Sherman & Donovan, 1991). When emotional support was reciprocal between the pregnant adolescent and her parents, a correlation was found between the bidirectional exchange of support and an increased well-being including higher levels of mastery and life satisfaction as well as lower levels of depression and anxiety (Stevenson et al., 1999).

1.5 Summary

Maternal bonding has been shown to be of importance due to its considerable impact on the development of a child's attachment. Despite its influence on infant attachment, the study of maternal bonding among pregnant and parenting adolescents has been limited. This literature review has highlighted some of the demographic and psychological factors that are likely to impact on adolescents' maternal bonding to their infant.

A number of studies have found that adolescent mothers were generally less well-bonded, less sensitive, and less responsive to their infant's interactions and less aware of the baby's physical needs than their older counterparts. The question of possible neglect or maltreatment has also been raised by some authors, based on adolescent mothers' lack of maternal skills and knowledge of infant development.

While maternal age appears to be positively associated with maternal bonding, many studies have noted that there is great variability among pregnant and parenting adolescents and their ability to successfully manage the maternal role. Consequently it has often been suggested that maternal age is not necessarily the risk factor, but that a combination of other demographic and psychosocial variables commonly associated with early parenthood may determine poorer outcomes. The literature review has shown the importance that maternal antenatal bonding, the woman's own upbringing and attachment experiences, depression, anxiety and social support have in predicting the development of

maternal bonding, creating a complex picture with outcomes likely to be influenced by interrelated variables. However as noted, most of the studies reviewed in relation to maternal bonding have been based on adult women.

In some of the adolescent studies described above it has been pointed out that if difficulties and problems are identified early in the antenatal period, and intervention is implemented, these young mothers-to-be would then be in a better position to adequately care for themselves and their infant. It has also been reported that the adolescents usually welcome the extra support and intervention (Quinlivan et al., 1999).

Many studies conducted in the United States with pregnant and parenting adolescents have examined differences associated with ethnicity and culture. However within the limited Australian research, issues of ethnicity and cultural differences among this group have been given little attention.

1.6 The Influence of Cultural and Religious Beliefs

Given the diversity of Australia's multicultural population it seems important to consider the influence of cultural and religious beliefs on the experiences of pregnant and parenting adolescents.

The following sections provide an overview of the literature available regarding cultural and religious beliefs. The main racial and ethnic groups commonly noted in American research are non-Hispanic White, Hispanic White and African American with many studies reporting differences according to racial groups (Logsdon et al., 2002; Milan, Lewis et al.; 2004; Rhodes et al., 1994; Trent & Harlan, 1994; Ventura et al.; 2006). However, these racial groups are very different from the ethnic composition of the Australian population and so results found in the American studies cannot be generalised to Australian adolescents. For this reason it is vital to first consider the ethnic spread, particularly within the Western suburbs of Melbourne, Victoria, given that this was the geographical region selected for this particular study. The profile reported below describes ethnicity and religious affiliation for the Western suburbs region from which the current sample was recruited.

1.6.1 A Community Profile

A variety of ethnic groups are represented in the population of Melbourne's Western suburbs (Victorian Multicultural Commission, 2003). Demographic data on the "Outer Western" region of Metropolitan Melbourne (see Figure 1 below) was obtained from the Australian Bureau of Statistics' (ABS) 2006 Census website.

Figure 1. Map showing "Outer Western Melbourne" (Source: ABS Website, 2007)

Based on the 2006 census results (Australian Bureau of Statistics, 2007), in the Outer Western Melbourne region 39.4% of a population of 611,518 was not born in Australia and 40.8% of the region's population spoke a language other than English at home. Even though 60.6% of the population reported that they were born in Australia, when the population was categorised according to 'Ancestry' only 20.6% of the region's population nominated 'Australian'. The next most frequently reported ancestries by those

living in this region were 'English' (16.2%), 'Italian' (7.2%), 'Irish' (5.5%), 'Maltese' (4.2%), 'Scottish' (4.2%), 'Vietnamese' (4.0%), 'Chinese' (3.2%) and 'Greek' (3.1%). It needs to be noted here that the list of countries individually named in the Census form was selected from the "most common country of birth responses (excluding Australia) reported in the 2001 census" which means that migrant groups that had recently arrived in the western suburbs of Melbourne (such as Horn of Africa migrants) were not reported individually. In fact, an Ancestry category labelled 'Other' comprised 7.7% of the population.

Furthermore, when "Ancestry by Country of Birth of Parents" was considered, taking into account only those individuals who had either both parents or either parent born overseas (making the individual a second generation migrant), the demographics changed slightly, with the principal difference being that a lower percentage reported to have one or both of their parents born in Britain (including England, Ireland and Scotland). Such information is worth noting as it can be hypothesized that ancestry is likely to be more meaningful to a second-generation migrant than a third- or fourth-generation migrant. The breakdown of "Ancestry by Country of Birth of Parents" for the Outer Western region included the following top five categories: 'Other' (7.0%), 'English' (6.6%), 'Italian' (5.5%), 'Vietnamese' (3.8%), 'Maltese' (3.5%).

Religious affiliation among the Outer Western Melbourne population was not as diverse, but still showed some variation. Also based on the Australian Bureau of Statistics 2006 Census data, 63.4% of the region classified themselves as 'Christian'. Percentages of

the region's population for the five most frequently occurring Christian denominations were as follows: 36.8% Catholic, 8.9% Anglican, 7.2% Eastern Orthodox, 3.0% Uniting Church and 1.9% Presbyterian and Reformed. Other major religious affiliations for individuals living in the Outer Western Melbourne region were: Buddhism – 5.4%, Islam – 3.8%, Hinduism – 1.0% and Judaism – 0.04%. Among Western region respondents to the Census, 15.2% stated that they had 'No Religion'.

These figures are similar to statistics provided for the Melbourne Metropolitan area. A total of 64.2% of the population was born in Australia (compared to 60.6% of the population for the Outer Western Melbourne region), while only 23.9% of the total population identified themselves as having Australian Ancestry (compared to 20.6% of the total population for the Outer Western Melbourne region). The next most frequently reported ancestries were also similar for the two groups under comparison, with the exception of Maltese ancestry which was clearly over-represented in the Outer Western Melbourne region. Religious affiliation percentages were also similar for the two groups, with only slightly higher percentages reported for all religions except Judaism in the Outer Western Melbourne region compared to the percentages for the Melbourne Metropolitan area at large. Correspondingly, 15.2% of Outer Western region respondents reported that they had 'No religion', while the corresponding figure for the Melbourne Metropolitan area was 18.6%.

1.6.2 Ethnicity and Cultural Beliefs

Overseas literature has described differences in pregnant adolescents according to ethnicity, with studies in the United States specifically noting differences between White, African American and Hispanic women (Logsdon et al., 2002; Milan, Lewis et al.; 2004; Rhodes et al., 1994; Trent & Harlan, 1994; Ventura et al.; 2006). While demographic data indicates that Australia is also a multicultural society, the cultural composition is very different to that in the United States, and so direct comparisons cannot be made. Within Australia, no studies were found that have considered the influence of different ethnic backgrounds on the pregnant adolescent. In cases where ethnic background has been referred to, this has been in the context of the reporting of the sample characteristics.

Racial differences were noted by Quinlivan et al. (2004) in their Melbourne adolescent sample in regard to the low number of women of Asian background compared to the control group which was made up of older pregnant women. The low Asian (and Pacific Islander) adolescent birth rate compared to other ethnic groups is a factor that has also been noted in American statistics (The National Campaign to Prevent Teen Pregnancy, 2007). Birth rates for indigenous women were reported to be higher than that of the total Australian population and indigenous women were also more likely to have a younger maternal age, with fertility rates reportedly four times higher for indigenous adolescents aged 15 – 19 years compared to the fertility rate of all Australian women in the same age group (Australian Institute of Health & Welfare, 2007).

Some overseas studies carried out with pregnant and parenting adolescents that have considered ethnicity, have looked at the different levels of support available to women from different races. Shin et al. (2006) reported that the amount of support provided for new mothers differs according to culture and tradition, with women from some countries being provided with more physical and psychological care for both herself and her infant. Logsdon et al. (2002) reviewed studies that have looked at the differences in social support as dependent on race or ethnicity. Differences were reported in some studies, in regard to the length of time the adolescent lived with their parents after the baby's birth and the support given by nuclear and extended family members and by the baby's father. Trent and Harlan (1994) also reported that the household arrangements of the pregnant adolescent varied, depending on, among other things, race and ethnicity.

Within the context of Australia as a multicultural society, some researchers have begun to look at the experiences of mothers and pregnant women from non-English speaking backgrounds. However these studies (Manderson, 1994; Rice, 1999; Small, Rice, Yelland & Lumley, 1999; Vose & Thurecht, 1999) have generally focused on the issues around childbirth for new migrants. The issues such as language barriers, varying antenatal attendance and unfamiliar birth practices faced by pregnant migrant women raised in these studies are likely to be different to those for pregnant and parenting adolescents who have been born in Australia or who have lived most of their lives here.

1.6.3 Religious Beliefs

Morals, faith and religious beliefs have been indicated to influence adolescent attitudes toward sexual behaviour (Whitehead, Wilcox & Rostosky, 2001). There has however been very little attention given to religious beliefs in regard to pregnant and parenting adolescents. The available literature (Frank & Kendall, 2001; Smith, 2003) highlights the important part such beliefs play in the lives of adolescents and in particular the influence such beliefs may have on adolescent risk behaviour by operating as a supportive and coping mechanism. Thornton and Camburn (1989) state that while the literature has indicated the presence of an inverse correlation between religious participation and adolescent sexual behaviour; it is possible that both factors are a result of family and personal attitudes.

Given that religious beliefs in many Christian denominations including Catholicism, and some non-Christian religions such as Islam, Sikhism and Hinduism hold strong positions against premarital and teenage sex and abortion, (Morgan & Lawton, 1996) it is important to consider how familial religious beliefs might impact on the outcomes for pregnant adolescents and their infants.

Thornton and Camburn (1989) postulate that when a person's individual values change and are discrepant with the person's religious beliefs it could alter the person's commitment and involvement with the institution. If this were to occur in the context of the adolescent becoming pregnant, it would be interesting to note whether the family's

affiliation to the church remains strong, if the family withdraws its support towards the adolescent or whether, as Thornton and Camburn suggest, it could result in a redefinition of the family member's position, so that religious participation is not affected. Sorenson, Grindstaff and Turner (1995) found that church attendance among unmarried pregnant adolescents resulted in higher levels of distress, explaining that the tension between the religious values and the pregnancy resulted in feelings of stress rather than support for the adolescent.

It has been shown that in Australia belief in religion is stronger in older members of the population. In fact, Quinlivan et al. (2004) found that compared to non-adolescent mothers, adolescent mothers were more likely to state that they did not have a religious belief. Such a finding needs to be considered in the context that rejection of parental beliefs is common in adolescents. However it could be argued that the religious beliefs of family members should still be taken into consideration in instances where adolescents have rejected them, as they could have direct/indirect effects on the outcomes for pregnant adolescents.

1.6.4 Application to Australian Pregnant Adolescents

As described above the Australian research available on ethnic and cultural beliefs has mostly sampled pregnant and postpartum women who were immigrants from non-English speaking backgrounds, and focused on their experience of birth practices in a new country, their difficulties in communicating with medical staff and how supported they felt

in their beliefs. Other available research is limited to investigation of the importance of cultural variability and individual preferences in regard to birth practices and the knowledge of medical staff in this area.

It is not clear if pregnant adolescents would experience the same concerns as the women in the studies above as many will have been brought up in Australia, and be able to speak English quite fluently, even if it is not the first language. However pregnant adolescents may face other difficulties, especially if adolescent sex or sex before marriage is against the religious and cultural beliefs of the family. In extreme cases this could result in the pregnant adolescent being rejected by the family.

There appears to be no research available on how religious and cultural beliefs impact on the Australian pregnant adolescent or on how parents and other family members from different cultural and religious backgrounds deal with the knowledge that their adolescent daughter has become pregnant.

2 Aims and Hypotheses

2.1 Rationale

Previous studies have indicated that pregnant and parenting adolescents are more likely to face a number of psychosocial challenges than their older counterparts. In turn, the presence of such difficulties may place the adolescent mother at risk of not developing a strong maternal bond toward her infant.

However, relatively little research has been carried out to date on the impact of psychological factors on maternal infant bonding for adolescents. Most of the studies examining maternal bonding or the maternal-infant relationship have focused on older women, and the majority of studies on the topic that *have* been conducted with adolescents have been with American populations (Clemmens, 2001; Elster, 1983; Logsdon et al., 2002; Milan, Lewis et al., 2004; Sartore, 1996). The cultural composition of Australia differs from that of the United States and both have variations across and within states. Furthermore, there have been no Australian studies that have specifically examined adolescent pregnancy and motherhood in a context of varying ethnic and religious backgrounds.

The significance of this study lies in the fact that it has the potential to identify some antenatal factors that can influence poor adjustment to motherhood during the

neonatal period. Knowledge of the factors influencing maternal bonding could also allow for the development and provision of appropriate assessments and interventions where necessary to reduce potential future risk for the infants and to promote the development of a healthier relationship between mother and child that may in turn enhance child development. The population of the Western suburbs of Melbourne has high ethnic and religious diversity and therefore will provide an opportunity to explore the influence of religious and cultural beliefs on adolescent mothers. Such exploration can only provide a preliminary understanding of these factors but could possibly suggest avenues for future research.

2.2 Aims and Hypotheses

The primary aim of the current research was to investigate a number of antenatal factors that may influence maternal bonding in adolescent mothers. It was originally proposed to test the influence of these antenatal factors at both six weeks postpartum and at three months postpartum. However, the number of subjects that could actually be recruited was lower than anticipated and this meant that it would not have been appropriate to run a multivariate analysis as proposed, due to power limitations. The analysis was subsequently modified so that only the 6 week postnatal data was used in the multivariate analysis.

Specifically, the main research question asked was: -

What is the relative contribution of the following variables, assessed during pregnancy, to maternal bonding at six weeks postpartum?

- The adolescent's own experience of being mothered (maternal care and maternal control)
- Anxiety symptoms
- Depressive symptoms
- Social support received during the antenatal period
- Antenatal maternal bonding

Since adolescents were recruited across the span of the antenatal period, gestational age was considered as a covariate, as studies indicate that foetal bonding is positively related to gestational age (Cannella, 2005; Lindgren, 2001; Salisbury et al., 2003; Wayland & Tate, 1993).

Figure 2 illustrates the relationships explored in this study, and how each of the independent factors was hypothesized to influence the dependent variable, maternal infant bonding at six weeks after the birth of the baby.

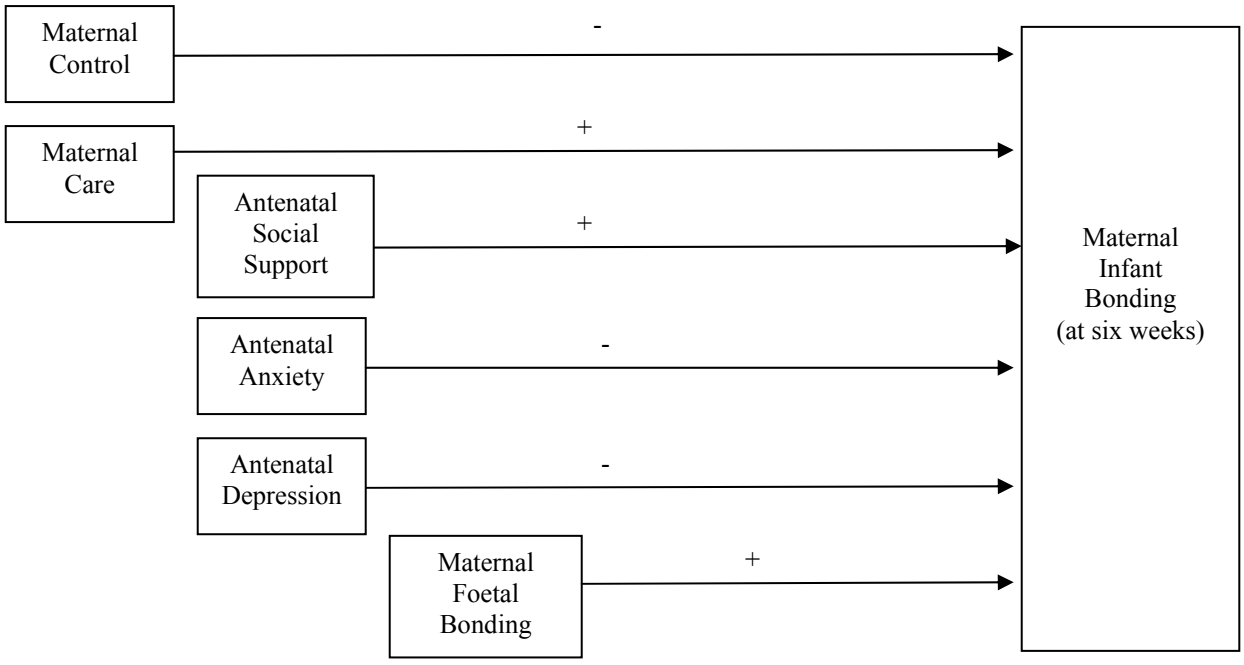

Figure 2. Variables hypothesized to influence maternal postnatal bonding at six weeks.

The following hypotheses were made:

1. Maternal control received in childhood will be negatively associated with maternal infant bonding at six weeks after birth.
2. Maternal care received in childhood will be positively associated with maternal infant bonding at six weeks after birth.
3. Anxiety during pregnancy will be negatively associated with maternal infant bonding at six weeks after birth.
4. Depression during pregnancy will be negatively associated with maternal infant bonding at six weeks after birth.
5. Maternal antenatal bonding will be positively associated with maternal infant bonding at six weeks after birth.
6. The social support received during pregnancy will be positively associated with maternal infant bonding at six weeks after birth.

The above hypotheses were tested using Pearson Correlations and the relative contributions of the above factors were then examined using Hierarchical Multiple Regression with maternal infant bonding at 6 weeks as the outcome variable. The order of entry of the independent variables was as follows:

Step 1: maternal control; maternal care

Step 2: antenatal depression; antenatal anxiety; received social support

Step 3: maternal antenatal bonding

Since maternal foetal bonding is considered to be a good predictor of maternal infant bonding (Condon, 1993) it was hypothesised that it may have a mediating effect on the associations between maternal bonding and the other antenatal factors. In order to assess the possibility of the presence of indirect relationships between the antenatal factors and maternal infant bonding via antenatal bonding, the following associations were also considered.

7. Maternal control received in childhood will have an indirect negative relationship with maternal infant bonding at six weeks, partially mediated by maternal antenatal bonding.
8. Maternal care received in childhood will have an indirect positive relationship with maternal infant bonding at six weeks, partially mediated by maternal antenatal bonding.
9. Anxiety during pregnancy will be negatively related with maternal infant bonding at six weeks in an indirect manner, partially mediated by maternal antenatal bonding.
10. A negative relationship between depression during pregnancy and maternal infant bonding at six weeks will be partially mediated by maternal antenatal bonding.
11. The positive relationship between the received social support during the pregnancy and maternal infant bonding at six weeks will be partially mediated by maternal antenatal bonding.

These hypotheses regarding the potential partial indirect pathways within the model were to be tested using Baron and Kenny's (1986) procedures (see section 3.4, p. 77).

A further aim of the research was to examine how different cultural and religious beliefs held by the adolescent and her family impact on the adolescent. As there are no previous research studies in this area this aspect of the thesis was exploratory in nature with no hypotheses generated and no statistical analyses conducted.

3 Methodology

3.1 Participants

3.1.1 The Sample

Participants in this study were primiparous pregnant adolescents aged between 13 and 19 years who attended either the Women's Clinic at Sunshine Hospital or the Young Mothers' Clinic at the Royal Women's Hospital in Melbourne, Australia. Exclusion criteria were a previous live birth, an inability to speak and read English and identified intellectual disability.

3.1.2 The Recruitment Sites

Two sites in Melbourne were used to recruit the participants required for this study – the Women's Clinic at Sunshine Hospital (Western Health) and the Young Mums' Clinic at the Royal Women's Hospital. Some statistics for the population of adolescent mothers aged 19 and younger were obtained from each hospital for the year 2006. These statistics are presented to provide an overview of the group under investigation.

3.1.2.1 Women's Clinic, Sunshine Hospital

For the year 2006, there were 148 births at Sunshine Hospital to adolescent women aged 19 years or younger. Of these women, 12% had had a previous live birth. No information was provided by this hospital as to the correct gravida for the mothers. Of the total, 60.8% were Australian-born and 9.5% were born in New Zealand. The latter formed the largest group of those born overseas. Other countries of birth nominated by these adolescent mothers were: Vietnam (4.7%); Chile, Lebanon and Sudan (2.7% each); Philippines (2.0%); Albania and Malta (1.4%); and 0.7% for each of Afghanistan, Ethiopia, India, Iraq, Malaysia, Nauru, Netherlands, Spain, Sri Lanka, Turkey, Uganda. A further 4.7% did not nominate a country of birth. There were 8.8% of the women who required an interpreter, with the majority of these women requesting either a Vietnamese or a Dinka (Sudanese language) interpreter.

3.1.2.2 Young Mums' Clinic, Royal Women's Hospital

At the Royal Women's Hospital, pregnant adolescents attend a special antenatal clinic set up specifically for young mothers-to-be, called the Young Mums' Clinic. In 2006, 89 adolescents who had attended this clinic gave birth. The statistics indicated that of these 89 adolescents, 36 women (40.4%) were previously pregnant at least once, including 19 women (21.3%) who had already given birth once. A small number of these non-primigravida women had experienced multiple terminations. The majority (77.5%) were Australian born. Those born overseas came from Ethiopia, Iraq, Lebanon, New

Zealand, Poland and Thailand (2.2% each); and China, Cook Islands, Djibouti, Egypt, Indonesia, Macedonia, Philippines and Sudan (1.1% each).

3.1.3 Recruitment

A total of 71 participants were recruited from the two hospitals, with 51 adolescents (71.8%) recruited from Sunshine Hospital, and 20 adolescents (28.2%) recruited from the Royal Women's Hospital. As results from independent samples *t*-tests indicated that there were no significant differences between adolescents from the two sites on any of the variables no further distinction was made according to recruitment site.

Table 2 shows a break-down of the number of adolescents who made appointments, whether they were recruited into this study and reasons for non-recruitment. Across the recruitment period there were 98 adolescents who met eligibility criteria and who were invited to participate in the study. Of these, 71 adolescents (72%) agreed to participate.

Table 2
Break-Down of the Number of Adolescents who Made Appointments

Description	Number	Percentage
Total number of adolescents noted who made an appointment to attend either clinic	165	100%
Adolescents not eligible to participate in the study:	**42**	
• Non-primiparous	16	10%
• Requiring an Interpreter	13	8%
• Other (failed to attend appointments until third trimester/ miscarriage/ adolescent under the age of 16 and parental consent not obtained)	13	8%
Adolescents eligible to participate in the study:	**123**	
• Not invited to participate in the study due to non-attendance at identified appointments or adolescent's choice to attend appointments at a community clinic	25	20%
Adolescents who were invited to be part of the study:	**98**	
• Declined to be part of the study	27	28%
• Agreed to be part of the study	71	72%

3.1.4 Attrition of Participants over time

There were a number of adolescents who after having formally agreed to be part of the study by signing the consent form, (refer to Appendix J) were not included in the final sample. Attrition occurred at different time points and for different reasons. Table 3 outlines the stage and reason for withdrawal.

Table 3
Reason for Withdrawal from the Study (n= 19)

Reason for withdrawal from study (as provided by adolescent or listed on the medical record)	No. of adolescents
Prior to completion of antenatal questionnaire:	
• Asked by partner to revoke consent	3
• Too busy	4
• Transfer to another hospital	1
Following completion of antenatal questionnaire:	
• Complications during pregnancy – transfer to another hospital	1
• Failed to attend subsequent antenatal appointments	3
Following the birth of the baby:	
• Unable to contact adolescent post-birth	3
• Adolescent withdrew consent	2
• Adolescent was not present for scheduled follow-up appointments	1
• Adolescent gave up care of infant	1

Eight of the adolescents withdrew from the study prior to having provided any information. There was a further attrition of eleven adolescents who for various reasons dropped out of the study after having provided antenatal data. Comparisons were made to note any differences between these eleven adolescents and the main sample. Total and sub-scale scores were compared for the two groups using an independent samples *t*-test. There was only one significant difference noted. The adolescents ($n = 11$) who left the study after providing antenatal data had a lower gestation in weeks mean score (*M*: 15.83, *SD*: 4.25) compared to those adolescents who remained in the study (*M*: 21.06, *SD*: 8.46); – $t(29.7) = 3.011$, $p = .005$.

While this comparison has been noted, no interpretation is made due to the variety of reasons for why the eleven adolescents were no longer part of the research, with only three of these women actively choosing to drop out.

3.2 Measures

3.2.1 Demographic Data Questionnaire

A background questionnaire (Appendix A) was developed and used to collect the following information: participant's age, ethnic background, education level, employment status, living arrangements, gestation, previous pregnancies, feelings about becoming a mother, involvement of the father, current relationship with family/father/current partner/friends.

3.2.2 Maternal Antenatal Attachment Scale (Condon, 1993)

The Maternal Antenatal Attachment Scale – MAAS, (Appendix B) a self-report measure, is used to assess maternal antenatal bonding to the unborn baby. It was developed in an attempt to create a questionnaire that adequately measured bonding to the foetus and did not contain questions to do with the 'pregnancy state' or the 'motherhood role', which Condon (1993) described as a pitfall of previously constructed questionnaires aimed at measuring the same construct. Condon noted that as the pregnancy progresses, the expectant parent would, in normal circumstances, develop "increasingly elaborated internalised representation of the foetus" (p 168) through which the parental emotional bond grows. The sample for Condon's study included pregnant women who were less than

38 weeks gestation. The study also included a corresponding independent paternal questionnaire for fathers-to-be. In the current research only the maternal measure (MAAS) was used. Item analysis and factor analysis were employed to select the most reliable items for the questionnaire from the original pool. The final 19 items for the maternal scale focus on feelings, attitudes and behaviours of the pregnant woman towards the foetus with responses recorded on a 5 point Likert Scale. Many of the questions require the respondent to select their answer based on their experience in the previous two weeks. Two factors were derived from the 19 items, and these were labelled 'Quality of Attachment' and 'Time spent in Attachment mode'. As well as scores for each of these sub-scales a Total Attachment score can also be calculated. Adequate internal consistency has been demonstrated with Cronbach's alpha > .80 (Condon, 1993). The reliability coefficient obtained with this sample was identical ($\alpha = .80$). The Total Attachment score was used in the current study.

3.2.3 Parental Bonding Instrument (Parker, Tupling & Brown, 1979)

The Parental Bonding Instrument – PBI (Appendix C) was designed to measure an individual's retrospective perceptions of the parenting they received in the first sixteen years of life from their parents, with separate questionnaires used for the mother and the father. For the purpose of this study, only the Mother form was utilised. The questionnaire comprises two independent sub-scales, "Care" and "Control" (sometimes referred to as "Overprotection") which emerged from a number of factor analytic studies of parental characteristics (Parker, Tupling, & Brown, 1979). Normative data based on an Australian

(Sydney) general practice sample, was reported in the above mentioned paper with mean scores of 27.0 for the "Maternal Care" subscale, and 13.5 for the "Maternal Control" subscale. Responses to the 25 items of the questionnaire (12 items making up the Care subscale, and 13 items in the Control subscale) are recorded on a 4 point Likert scale, with scores for each item ranging from 0 – 3. Adequate psychometric properties were established. Results of reliability studies carried out with different samples and settings (Parker, 1989) reveal a strong internal consistency, with alphas being generally reported as above 0.8 for both subscales. Similarly, for the current sample $\alpha = .90$ for the Care subscale and $\alpha = .80$ for the Control subscale.

3.2.4 Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987)

The Edinburgh Postnatal Depression Scale – EPDS (Appendix D) was developed as a screening measure to help primary health care workers to identify mothers who were suffering from postnatal depression. Respondents are asked to select one of four possible responses (0-3) to each of ten statements to indicate how they felt in the previous week with a possible maximum score of 30. The EPDS has also been validated for use during pregnancy (Murray & Cox, 1990) and is particularly suited to pregnant and postpartum women because it excludes somatic symptoms of depression, which can be normal physiological symptoms associated with pregnancy and the postpartum period (Cox et al., 1987). A cut-off score of 13 has been used in many studies of postnatal depression (Pope, 2000) but a more stringent cut-off score of 14 has been recommended for use during pregnancy (Murray & Cox, 1990). The EPDS has been found to have adequate sensitivity,

specificity and positive predictive value when used postnatally (Cox et al., 1987; Murray & Carothers, 1990) as well as when used during the antenatal period (Murray & Cox, 1990). Cronbach's alpha was obtained for both the antenatal and postnatal (at six weeks and three months) data-collection points with the current sample. During the antenatal period an α = .77 was achieved, with higher reliability coefficients during the postnatal period (α = .87 at six weeks postnatal).

3.2.5 Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)

The Hospital Anxiety and Depression Scale – HADS (Appendix E) is a self-rated measure used for detecting states of depression and anxiety, existing in the period of "the past week". The screening tool has 14 items that are rated on a four-point Likert scale, ranging from 0 – 3. There are two separate scales, Anxiety (HADS-A) and Depression (HADS-D), with seven items in each scale and a maximum score of 21 points. Cut-off scores allow for categorization into normal, mild, moderate and severe states for the two factors, with a cut-off score of 8+ suggesting 'possible cases' (Zigmond & Snaith, 1983) and a cut-off score of 11 or higher "indicating probable presence" (Snaith, 2003) of a disorder. Jomeen and Martin (2004) cautioned that the HADS may not be a reliable screening tool during early pregnancy, as during the early antenatal period, the two subscales did not appear to measure anxiety and depression as two separate and distinct dimensions. For the purpose of this study, only the Anxiety sub-scale was used because the EPDS is considered to be a more reliable measure of depression with this population (see above). The reliability and validity of the HADS for assessing 'caseness' of both

anxiety and depression disorders was examined by Bjelland, Dahl, Haug and Neckelmann (2002) who reviewed a number of papers that had utilised the HADS and had reported satisfactory psychometric properties. Based on this review, Bjelland et al. reported that validity for 'caseness' was established and that internal reliability as measured by Cronbach's alpha for the HADS-A ranged between 0.68 and 0.93, with a mean of 0.83. Adequate reliability was also obtained with the current sample with a coefficient of .74 during the antenatal period and coefficients of .83 for the six week postnatal period.

3.2.6 Postpartum Support Questionnaire (Logsdon 2002)

The Postpartum Support Questionnaire – PSQ (Appendix F) was designed to measure the amount of social support received by mothers in the postpartum period. A particular strength of the PSQ is that it measures both the importance of the support and the received levels, as perceived by the mother. The PSQ contains 34 items, with each item rated for "Importance" (range: 0 not important – 7 very important) and "Help Received" (range: 0 no help – 7 lots of help) along an 8-point Likert scale. A number of sub-scales reflect the different kinds of support, Material Support, Emotional Support, Informational Support and Comparison Support. The two dimensions across the four subscales allows for a rich data set, as the availability of the different kinds of support can be contrasted, and discrepancy scores can be calculated as the subscales are summed separately for Importance and Help Received.

A number of studies have demonstrated strong reliability and validity data (Logsdon & Davis, 1997) including previous studies carried out by Logsdon and various associates (Logsdon & McBride, 1989; Logsdon & McBride, 1991; Logsdon, McBride & Birkimer, 1994) that reported Cronbach's alphas of .79 - .94 for 'importance of support' and .92 - .96 for 'support received'. The questionnaire can be reworded for use during the antenatal period, so as to determine the amount of support the adolescent anticipates that she will receive after the baby is born, with items to be rated on "Importance" and "Help Expected" scales. The antenatal version of the PSQ was used for the purposes of this research. The antenatal questionnaire also included three questions that asked about the availability of, and satisfaction with antenatal support. Equally high reliability coefficients were obtained with the current sample during the antenatal period for both subscales: $\alpha = .94$ for 'importance of support' and $\alpha = .96$ for 'help expected'.

Recently the PSQ was revised and validated for use specifically with pregnant adolescents (Logsdon & Usui, 2006). Unfortunately it was not possible to utilize this revised version as the current research was already underway and a substantial amount of data had been collected using the original PSQ questionnaire prior to publication of this article.

3.2.7 Maternal Postnatal Attachment Scale (Condon & Corkindale, 1998)

The Maternal Postnatal Attachment Scale – MPAS (Appendix G) was developed as a self-report measure to assess the affective aspect of the mother-to-infant bonding in the

infant's first year of life. The theoretical framework on which the questionnaire was based was similar to that used for the antenatal bonding scale, (MAAS, Condon, 1993) described above. The questionnaire was developed after conducting unstructured interviews with ten women who had an infant under the age of one year, so as to determine the 'subjective experiences' of a mother's thoughts and feelings relating to bonding towards her infant. In a similar fashion to the MAAS many of the statements ask for a response based on the mother's experience in the last fortnight.

After carrying out an item analysis, all but 19 items were eliminated with an internal consistency (based on Cronbach's coefficient alpha) of 0.78 (Condon & Corkindale, 1998). Four factors emerged out of Condon and Corkindale's analysis: Pleasure in proximity with the infant and enjoyment during interaction with him/her, Acceptance of the infant and a lack of resentment of the impact it has had on the mother's lifestyle, Tolerance of the infant and absence of angry or hostile feelings towards the baby and feelings of Competence and confidence as a parent. Each factor was considered to be a subscale, and sub-scores could be calculated, together with a total score. Only the total score was used for the purposes of this study, as the addition of four factors as dependent variables with a small sample size would have reduced power to an unacceptable level.

Each item has a range of two to five options reflecting the frequency with which such an experience occurs. An adjustment to allow for the different number of response categories per item is required before summing the items to obtain the MPAS total score.

Cronbach's alpha was calculated to test internal reliability with this sample with a coefficient of .74 obtained during the six week postnatal period.

3.2.8 Religious and Cultural Beliefs Interview

The antenatal data collection involved a semi-structured interview (Appendix H) to collect qualitative information regarding religious and cultural beliefs, including:

- Strength of religious affiliation
- Strength of parents' religious affiliation
- Beliefs pertaining to that religion
- Religious practice and personal involvement
- Rituals/Traditions performed
- Cultural affiliation
- Beliefs pertaining to that culture
- Involvement in that community
- Reactions to the pregnancy – of self, partner, parents, friends, community (including that of unmarried mothers and adolescent pregnancy).

3.3 Procedure

3.3.1 Ethics Approval

Ethics approval was obtained from the following committees:

- The Human Research Ethics Committee of Melbourne Health
- The Human Research Ethics Committee of the Royal Women's Hospital
- The Victoria University Human Research Ethics Committee, Victoria University

3.3.2 Recruitment Procedure

Potential eligible participants were approached by the researcher in the waiting room of the antenatal clinic. After describing the study, providing the Participant Information sheet (Appendix I) and answering any questions about the study, the researcher invited the young woman to participate in the study. If the pregnant adolescent was willing to participate she was then asked to sign a consent form (Appendix J). Signed parental consent was obtained if the adolescent was under the age of 16 (Appendix K). Where possible, when the adolescent informed the researcher that she wanted to withdraw consent, a request was made by the researcher for a revocation of consent form to be completed (Appendix L).

3.3.3 Data Collection

At the time of recruitment, participants were requested to provide contact details for themselves (including address and phone numbers) as well as contact numbers for two other people (relatives or friends) to facilitate postnatal follow-up. The women were then asked to complete questionnaires and to take part in a semi-structured interview.

Information regarding the birth and the health of the baby was obtained from the medical records. This information included the gestation at birth, the length of the labour, the infant's sex, the type of delivery, the baby's birth weight, an Apgar score and neonatal morbidity.

Six weeks after the birth of the baby, participants were contacted by telephone to schedule an appointment for completion of post-natal questionnaires. This procedure was then repeated at the three month period, where the same set of postnatal measures was once again administered. Data collection at these postnatal stages was conducted in the adolescents' homes.

Table 4 shows the questionnaires administered and information collected at each of the three data collection points.

Table 4
Questionnaire Administration at each Data Collection Time Point

List of questionnaires /interview	Antenatal period	Postnatal Period: six weeks	Postnatal period: three months
Demographic data and background questionnaire	√		
Maternal Antenatal Attachment Scale (MAAS)	√		
Maternal Postnatal Attachment Scale (MPAS)		√	√
Parental Bonding Instrument (PBI)	√		
Edinburgh Postnatal Depression Scale (EPDS)	√	√	√
Hospital Anxiety and Depression Scale (HADS)	√	√	√
Postpartum Support Questionnaire (PSQ)	√		
Religious and cultural beliefs semi-structured interview	√		

In the event where a participant expressed to the researcher a wish to receive professional support to manage psychosocial issues, or where high scores were obtained on either the depression or anxiety scales, a number of referral options were provided to the participant. During the antenatal period, it was suggested to the participant that she speak to the social worker available at the hospital. During the postnatal period, where contact with hospital staff was no longer ongoing, the adolescent was encouraged to contact her General Practitioner.

3.4 Data Analysis

3.4.1 Testing of the Proposed Model

The data was analysed using the SPSS for Windows release 12.0 (2003) software package. Pearson Correlation analyses were run on all variables to allow consideration of the collinearity that is characteristic of many psychosocial variables. Hierarchical Multiple regression analyses were run using the independent variables maternal control, maternal care, antenatal depression, antenatal anxiety, maternal antenatal bonding and received social support in the antenatal period and with maternal infant bonding at six weeks as the dependent variable for the analysis. The order of entry for the independent variables was described in the Aims and Hypothesis chapter, page 58. The model was examined for significance and the relative strength of the contribution of each independent variable to the dependent variable was noted.

3.4.2 Testing of Indirect Pathways to Maternal Infant Bonding

Baron and Kenny (1986, p. 1176) proposed the following model (Figure 3) to depict indirect or mediated pathways and the associated recommended procedures for testing for the presence of any indirect pathways were utilised in the current research.

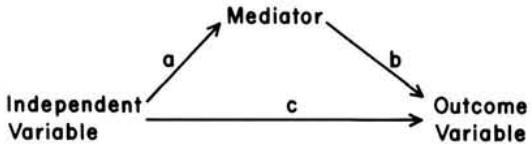

Figure 3. Model to depict indirect or mediated pathways (Baron & Kenny, 1986, p. 1176).

For the purpose of this study each of the following antenatal factors was considered individually as an independent variable: maternal control, maternal care, depression, anxiety, and received social support. Each was proposed to be tested with maternal infant bonding as the outcome variable and antenatal bonding as the mediator.

For antenatal bonding to be considered as a mediator, Baron and Kenny (1986, p. 1176) have stated that it has to satisfy the following conditions:

(a) variations in levels of the independent variable significantly account for variations in the presumed mediator (i.e., Path a),

(b) variations in the mediator significantly account for variations in the dependent variable (i.e., Path b), and

(c) when Paths a and b are controlled, a previously significant relation between the independent and dependent variables is no longer significant, with the strongest demonstration of mediation occurring when Path c is zero.

According to Baron and Kenny (1986, p. 1177), the test for mediation involves the estimation of three regression equations:

(a) regression of the mediator on the independent variable, to establish whether the independent variable does affect the mediator.

(b) regression of the outcome variable on the independent variable, to establish whether the independent variable affects the outcome variable.

(c) regression of the outcome variable on the independent variable and the mediator, to establish whether the mediator affects the dependent variable.

3.4.3 Analysis of the Interview Data

The study also looked at the different cultural and religious belief systems held by the adolescents and their families and explored their importance and any influence such factors may have had on the adolescent. Responses from the semi-structured interviews held with the adolescents were categorised and integrated into a number of topics, based on the interview schedule (refer to Appendix H). Descriptions were then compiled for each topic, including comparisons, contrasts and quotes where appropriate so as to express the adolescents' views on the impact of their own and their families' cultural and religious beliefs.

3.5 Power Analysis

Several calculations were undertaken using programs specifically designed for determining power in relation to effect size and sample size in the case of multiple regression analysis (Borenstein, Rothstein, & Cohen; 1997).

To ensure that there would be sufficient power for the proposed regression analysis given the expected sample size two tests were run to cover a range of possible effect sizes. Results from these tests are given below.

The model employed for this study included six variables (depression, anxiety, antenatal bonding, maternal control, maternal care, and received social support), that yielded an increment of .400. That is the total R-squared for the 6 variables in the model is .400. With a sample size of 60 and alpha set at .05 the study will have power approaching 1.00 (Figure 4).

There have been no previous studies that have used this same combination of predictor variables therefore it is not possible to draw on previously reported effect sizes. However an effect size of .40 is reasonable based on a recent Melbourne study conducted by Gilson & Lancaster (2004) which had the same outcome variable, maternal bonding to the infant and sampled the same population – adolescent mothers. The regression analysis for that study included six variables, and the R-squared = .41).

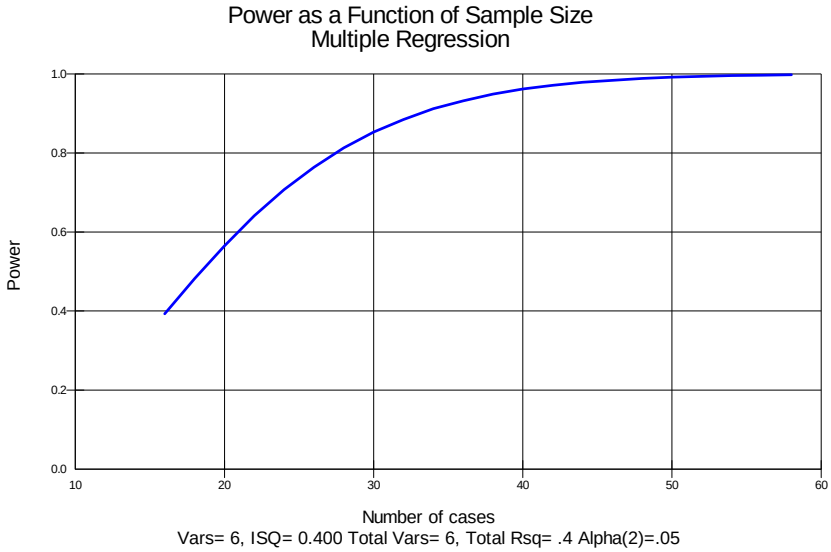

Figure 4. Power as a function of sample size (effect size = .40)

A further calculation using the same 6 variables in the set of interest, the same sample size, *n*=60, and an alpha set at .05 was made to allow for the possibility of a smaller effect size. Even in a situation where the total R-Squared for the 6 variables in the model is .200 the study would have power of 0.79 (Figure 5). This effect was selected as the smallest effect that would be important to detect, in the sense that any smaller effect would not be of clinical or substantive significance. Therefore with a sample of 60 participants with 6 variables in the model and an effect size of between .20 and .40 the study would have power between .79 and 1.0.

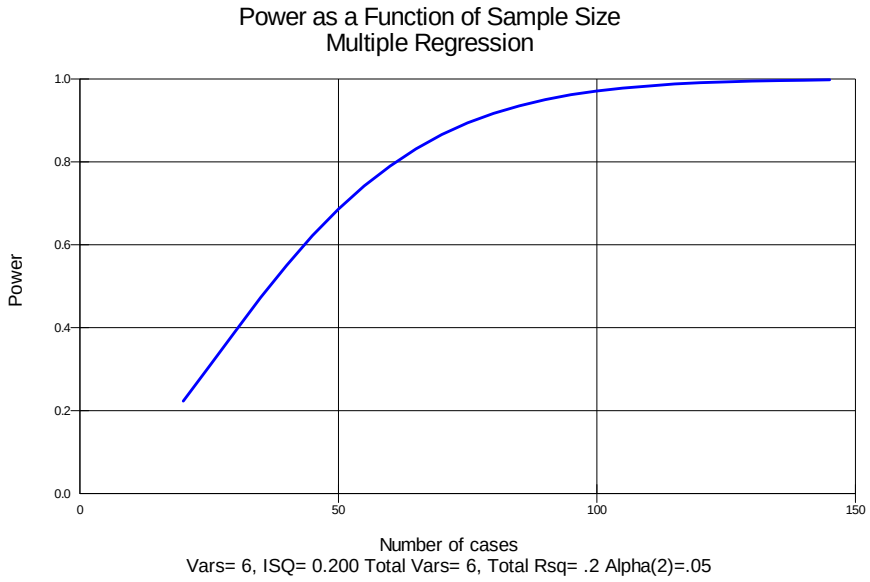

Figure 5. Power as a function of sample size (effect size = .20)

Due to the longitudinal design, it would be expected that some adolescents will drop out of the research for a variety of reasons – which could include but are not limited to – a choice to no longer participate in the investigation, miscarriage, or re-location to another state. Gilson & Lancaster's (2004) study, which also used a longitudinal design with pregnant adolescents in Melbourne, resulted in an overall attrition rate of 12% between the first interview during the third trimester and the last assessment at 6 months postpartum. Assuming that the attrition rate for this study is comparable, it was calculated that this study will need to recruit 70 adolescents to achieve a sample size of 60 (after allowing for attrition) as indicated from the above power analysis.

4 Results

4.1 Sample Characteristics

4.1.1 Demographic and Background Information

The final sample was made up of a total of 52 participants. The participants were aged between 15 and 20 years with a mean age of 18 years 4 months (*SD*: 1 year 5 months) and the mean gestation age in weeks at the time of first contact was 21.06 weeks (*SD* 8.46 weeks; range 9 – 39 weeks). The large range in gestational age was in most cases due to some adolescents presenting at a late stage in their pregnancy, or having missed previous antenatal appointments that were scheduled by the hospital. In some cases it was not possible to speak with the adolescents on their first appointment, and so they were followed up at a subsequent one.

Adolescents were asked about their education and employment status. The Victorian (Australian) education system comprises twelve years of schooling, of which the last six years, Year 7 through to Year 12 are completed in high school. The data collected is summarised in Table 5.

Table 5
Education Level and Current Employment

	Number (n = 52)	Percentage (%)
Level of education reached:		
• Year 8	1	1.9
• Year 9	6	11.5
• Year 10	21	40.4
• Year 11	7	13.5
• Year 12	13	25.0
• Tertiary education	4	7.7
Current employment:		
• Unemployed	33	63.5
• Part time employment	4	7.7
• Full time employment	5	9.6
• Student	10	19.2

The adolescents' educational level varied from a Year 8 level of education (last year of Junior High) to those who were engaged in tertiary level study (post high school, including university undergraduate or vocational training). Nearly half of the participants had completed Year 10 (Sophomore year) or higher. At the time of recruitment the majority of the adolescents were unemployed (64%); 19% of participants identified themselves as students. Some adolescents spoke of returning to study after the baby was born.

Participants were requested to name their country of birth and to identify their ethnic background. The percentage of adolescents born in Australia was 77%. The majority of overseas-born participants were from New Zealand (10% of the sample). Seven other adolescents were born in the following countries: Sudan, Bangladesh, Chile, Malta, Pakistan and the Philippines. Half the sample (50%) identified an ethnicity other than

Australian; with 'Maori' being the second highest represented ethnic background (14%). The ethnic backgrounds listed included Maltese, Chilean, Italian, Polish, Sudanese, Arabic (Jordan/Britain), Bangladeshi, British, Cook Islander, Filipino, Hungarian, Latin American (Argentina/Uruguay), Pakistani and Romanian.

The participants were asked to provide information in relation to any previous pregnancies. The current pregnancy was the first pregnancy for 83% of the participants while 12% of the sample reported the termination of a previous pregnancy and 6% had experienced a miscarriage or stillbirth. Given that one of the inclusion criteria was that participants were primiparous there were of course no reports of previous live births.

Adolescents were asked whether the current pregnancy was planned. They were also asked about their initial feelings in regard to the pregnancy and impending motherhood, as well as whether there had been any thoughts about terminating the pregnancy. This information is reported in Table 6.

Table 6
Information Relating to Current Pregnancy

	Number (n = 52)	Percentage (%)
Current pregnancy planning:		
• Definitely planned	6	11.5
• Not actively planned	24	46.2
• Definitely an accident	22	42.3
Initial reaction to current pregnancy:		
• Totally positive	19	36.5
• Generally positive but some negative feelings	28	53.8
• Totally negative	5	9.6
Emotions re impending motherhood:		
• Very confident	17	32.7
• Confident	21	40.4
• Neither confident nor unconfident	12	23.1
• Unconfident	1	1.9
• Very unconfident	1	1.9
Consideration to terminate current pregnancy:		
• Yes	11	21.2
• No	41	78.8

While most of the participants (89%) reported that they had not actively planned to become pregnant, only 21% had considered the option of abortion. Furthermore, while just over half of the sample had mixed feelings about the pregnancy, the initial reaction to the pregnancy for most participants had included positive emotions. The majority of participants (73%) felt either confident or very confident about becoming a mother at the time of responding to the questionnaire.

The adolescents were asked to report who they were living with at the time the questionnaire was administered, and how long this living arrangement had been in place. This information is shown in Table 7.

Table 7
Living Situation

	Number (n = 52)	Percentage (%)
Current living situation:		
• Mother	11	21.2
• Father	2	3.8
• Both parents	10	19.2
• Partner	14	26.9
• Partner and partner's family	8	15.4
• Alone	1	1.9
• Other	6	11.5
Length of time in this living arrangement:		
• Less than 6 months	20	38.5
• Less than 1 year	5	9.6
• 1 – 2 years	10	19.2
• More than 2 years	17	32.7

The majority of the participants in this study reported that they lived either with one or both of their parents, with their partner, or with their partner and his family. Over a third had made changes to their living arrangements in the previous six months. It is not known how many of the adolescents made these changes specifically because of the pregnancy. While providing their contact details, some participants spoke of plans to move out of their current residence in the subsequent months, prior to or just after the birth of the baby. Participants' responses to questions about their relationship with their partner and their mother are shown below in Table 8.

Table 8
Relationships with Others

	Number (n = 52)	Percentage (%)
Current partner:		
• No partner	9	17.3
• Father of the baby	43	82.7
• Not the father of the baby	0	0
Current relationship with mother:		
• Mother not alive	3	5.8
• Close relationship	29	55.8
• Fair relationship, reasonably warm	13	25.0
• Poor relationship, not particularly warm	3	5.8
• Very poor relationship, cold or hostile	1	1.9
• No contact	3	5.8

At the time of completing the antenatal questionnaire a large majority (83%) of the participants reported that their current partner was the father of their baby. Most adolescents (56%) described their relationship with their mother as close and a further 25% indicated that they had "a fair, reasonably warm relationship" with their mother.

4.1.2 Questionnaires Administered During the Antenatal Period

Five questionnaires were administered during the antenatal period providing data for the six variables tested in the multivariate analysis. The variables measured were: antenatal bonding (Maternal Antenatal Attachment scale (MAAS)), maternal care and maternal control (Parental Bonding Instrument (PBI)), anxiety (anxiety subscale of the Hospital Anxiety and Depression Scale (HADS-A)), depression (Edinburgh Depression Scale (EDS)) and received social support (based on one subscale of the Postpartum Support

Questionnaire (PSQ) which was worded for use during the antenatal period). Descriptive statistics, including range, minimum and maximum scores, mean and standard deviation, on each of these variables are reported in Table 9.

Table 9
Sample Descriptives at the Antenatal Period (n = 52)

Variable	Possible range	Minimum score	Maximum score	Mean	Std deviation
Antenatal bonding (MAAS)	19 – 95	49	90	75.62	8.90
Maternal care (PBI)	0 – 36	1	36	26.38	8.03
Maternal control (PBI)	0 – 39	5	34	14.38	7.05
Anxiety (HADS-A)	0 – 21	0	15	6.27	3.74
Depression (EDS)	0 – 30	0	21	8.81	4.85
Social support received in the antenatal period (PSQ)	0 – 7	2	7	5.90	1.51

While the data displayed valuable information on the sample means and standard deviations for each of the variables tested, the actual score range (minimum score and maximum score) indicated that there was some variability among participants' scores. The HADS-A and EDS allow for standardised categorisation of scores, which can aid score interpretation.

Scores on the anxiety subscale of the HADS-A can be classified according to the degree of anxiety: normal (0 – 7), mild (8 – 10), moderate (11 – 14) and severe (15 – 21). The mean score fell within the "normal" range, indicating that on average the sample was not anxious. When the percentage of scores in each anxiety category was calculated, the following breakdown emerged: Normal – 67.3%, Mild – 15.4%, Moderate – 15.4%, Severe – 1.9%. The majority of adolescents had scores that fell within the "normal" range. Only 1

adolescent was considered to be "severely anxious" based on this measure. However, nearly a third of the sample responded in a manner that classified their scores as falling in the "mild" or "moderate" range for anxiety.

The mean score for depression as measured by the EDS was 8.81 which indicated that as a group these adolescents were unlikely to be suffering from depression. However 17.3% of the sample had scores of 14 or greater, which is the recommended cut-off point used to indicate probable depression during the antenatal period (Murray & Cox, 1990).

The PSQ, worded for use during the antenatal period, provided a large amount of information on the adolescent's perception of the availability of social support during the antenatal stage as well as information on the social support she anticipated she would receive after the baby was born. The subscales and the sample descriptives for the data collected are described in Table 10. Possibly due to the complexity of the measure, four of the adolescents omitted a number of responses. It was decided that due to the relatively large amount of missing values for these adolescents on either of the subscales, their cases were not included. Another participant provided information that was excessively skewed (by responding '0' on nearly all items) and so this case was also not included in the analysis below, as the means and standard deviations reported would otherwise not be representative.

Table 10
Postpartum Support Questionnaire Sample Descriptives, at the Antenatal Period

Postpartum Support Questionnaire	*n*	Possible range	Min score	Max score	Mean	Std deviation
Social support during the antenatal period:						
Amount of support received antenatally	52	0 – 7	2	7	5.90	1.51
Satisfaction with support received antenatally	52	0 – 7	1	7	5.87	1.63
Anticipated need (How Important) and provision (Help Expected) of social support during the postnatal period:						
Importance given – total	49	0 – 238	33	203	131.76	44.23
Important: material support	49	0 – 63	7	63	33.04	12.32
Important: emotional support	49	0 – 70	0	70	38.84	17.64
Important: informational support	49	0 – 70	2	67	44.57	14.92
Important: comparison support	49	0 – 35	0	32	15.31	9.79
Help expected – total	47	0 – 238	21	238	139.04	56.89
Expected: material support	47	0 – 63	5	63	38.26	17.15
Expected: emotional support	47	0 – 70	0	70	40.17	17.33
Expected: informational support	47	0 – 70	2	70	43.40	19.03
Expected: comparison support	47	0 – 35	0	35	17.21	10.99

With a range of 0 – 7 and means for antenatal support received (5.90) and antenatal support satisfaction (5.87), the scores indicate that as a group the adolescents felt quite well supported at the time of assessment, and equally satisfied with the amount of support they were receiving.

Bivariate Pearson correlations were run for each of the corresponding "How Important" and "Help Expected" totals and four subscales, using pairwise deletion. All revealed significant correlations at a $p < 0.000$ significance level, reported in Table 11,

indicating that the participants anticipate that generally, their need for support after the birth of the baby will be met.

Table 11
Bivariate Correlations for Corresponding Antenatal 'How Important' and 'Help Expected' Totals and Subscales ($p < 0$ .000)

Description of related variables	*r* value
Important and Expected: totals	.626
Important and Expected: material Support	.549
Important and Expected: emotional Support	.622
Important and Expected: informational Support	.695
Important and Expected: comparison Support	.692

When considered on a case by case basis, it was noted that while some women expected to get a lot more support than they required, others felt that they would not be receiving enough support compared to their need. Differences were also noted between subscales, with adolescents perceiving that their material support needs were least likely to be met, and informational support needs most likely to be met.

4.1.3 Birthing Information

Birthing information was collected for those participants who continued into the postnatal part of the study. Information from one participant was not included as she gave birth at a different hospital. Of the total births ($n = 51$), 68.6% of the infants were male and 31.4% were female. Almost all of the young women experienced a vaginal delivery (92.2%), while 7.8% underwent a Caesarean. Other information collected included data

relating to the gestation at birth, length of labour, baby's weight at birth, and APGAR scores. This information is summarised in Table 12 below.

Table 12
Birthing Information Descriptives

	n	Minimum score	Maximum score	Mean	Std deviation
Gestation at birth (weeks)	51	35	42	39.49	1.64
Labour length (hours)	51	1.5	21.5	9.19	4.7
Baby's weight (grams)	51	2156	3980	3258	429
	n	Minimum score	Maximum score	Mode (%)	
APGAR score at 1 min	51	4	9	9 (42.0%)	
APGAR score at 5 min	51	4	10	9 (90.0%)	

Generally, those women who had a Caesarean section stayed in hospital with their infants for three or four days compared to the average of two-day stays for those women who had a vaginal delivery. Thirteen of the infants suffered some form of neonatal morbidity such as cardiac disease, neonatal feeding problems, respiratory distress syndrome, hypoglycaemia, hyponatraemia, jaundice, sepsis, hypospadias, cephalhaematoma, hypothermia, prematurity or birth trauma (particularly bruising or caput succedaneum). As a result of these complications, eight of the infants were not discharged from the hospital within the usual time-frame but had hospital stays between 3 and 18 days though not all newborns were reported to have been kept in special care nurseries.

4.1.4 Questionnaires Administered During the Postnatal Period

During the postnatal period, three questionnaires were administered at six weeks and three months postpartum to collect information about postnatal bonding (Maternal Postnatal Attachment Scale (MPAS)), postnatal anxiety (Hospital Anxiety and Depression anxiety subscale(HADS-A)) and postnatal depression (Edinburgh Postnatal Depression Scale (EPDS)). Descriptives for these scores as reported at the six week interval and three month interval are displayed in Table 13. In addition, figure 6 and figure 7 show the distribution of scores for the MPAS at six weeks and three months respectively.

Table 13
Sample Descriptives at the Postnatal Period

Variable	*n*	Possible range	Min score	Max score	Mean	Std deviation
Postnatal bonding (MPAS)						
Six weeks	52	19 – 95	60.2	95.0	84.31	6.85
Three months	49	19 – 95	71.4	95.0	85.16	5.67
Postnatal anxiety (HADS-A)						
Six weeks	52	0 – 21	0	16	5.00	4.23
Three months	49	0 - 21	0	14	4.78	3.72
Postnatal depression (EPDS)						
Six weeks	52	0 – 30	0	22	7.25	5.43
Three months	49	0 – 30	0	17	6.45	4.92

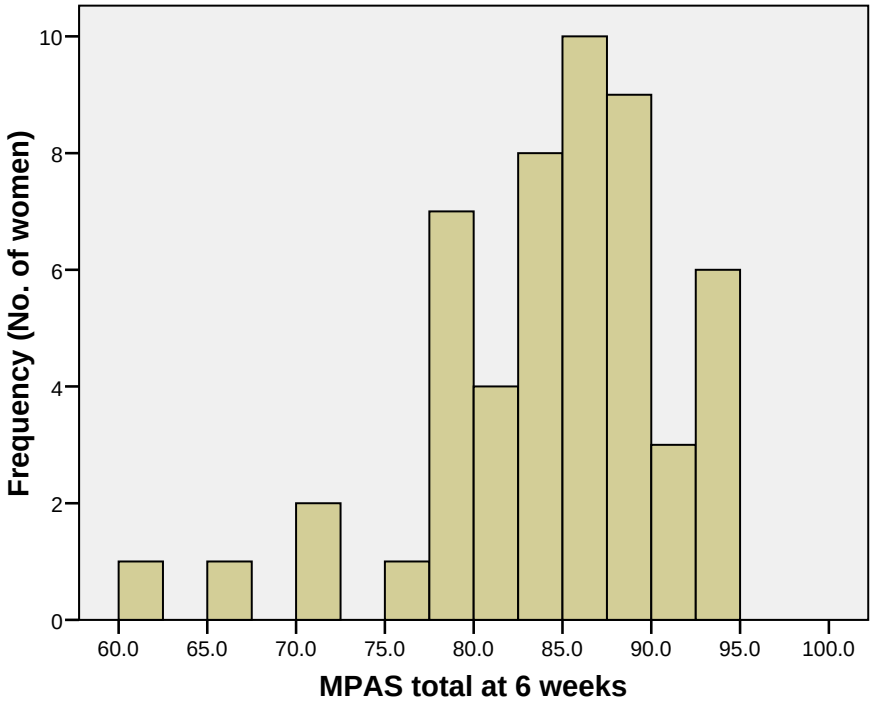

Figure 6. Histogram: Distribution of the MPAS total scores at 6 weeks

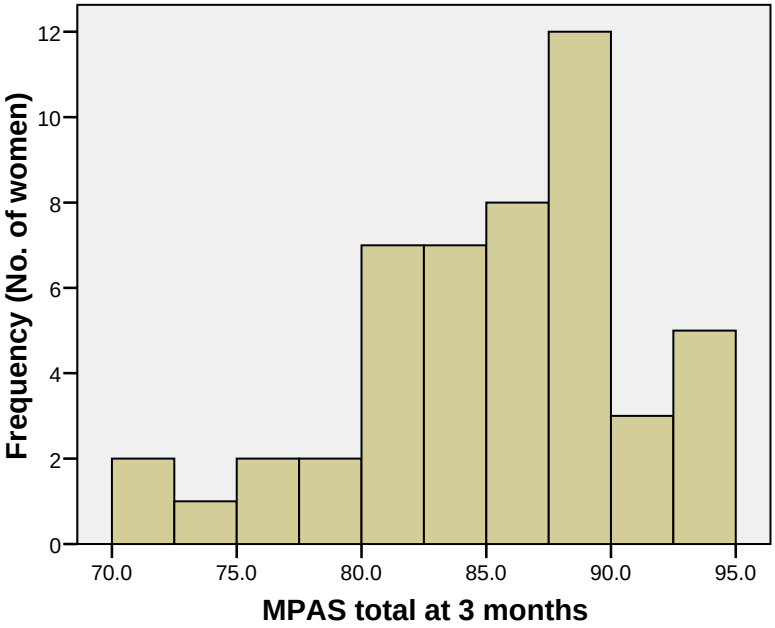

Figure 7. Histogram: Distribution of MPAS total scores at 3 months

These results indicate that as a group the sample was reportedly strongly bonded to their infants, with scores at the higher end of the scale at both time points. The distributions illustrate some negative skewing, particularly at the six week phase. A measure of skewness for the MPAS scores was generated, with a value of -1.169 at six weeks and -.454 at three months. As postnatal bonding at six weeks was the outcome variable for this study, implications of the skewness were considered in section 4.2.1.

The descriptives also show that overall the group was neither anxious nor depressed in the postnatal period. When the anxiety scores were categorised into the four ranges of normal, mild, moderate and severe, it was noted that the sample's levels of anxiety decreased in the six weeks between the first and second postnatal follow-up, so that there were less scores in the moderate range and none in the severe range at the three month time-point. Similarly, the number of adolescents who reported experiencing depressive symptoms (using the recommended postnatal cut-off point of 13 and over, by Pope, 2000) also decreased over time. During the six week data collection 17.3% of the sample scored at or above 13, while 14.3% of the sample reached the cut-off point at three months postpartum. Based on the maximum scores obtained on the depression scale (22 and 17 at six weeks postpartum and three months postpartum respectively), it would appear that there also was a reduction in the quantity of depressive symptoms in the later postpartum stage.

4.2 Statistical Analyses

The primary aim of the current research was to investigate the influence of a number of antenatal factors on maternal infant bonding in adolescent mothers at six weeks postpartum. The relative contribution of foetal bonding, maternal care, maternal control, antenatal anxiety, antenatal depression and received social support during pregnancy to maternal bonding was examined.

Reference was made to a number of books describing data analysis (Brace, Kemp & Snelgar, 2006; Bryman & Cramer, 2001; Coakes, 2005; Spicer, 2005; Tabachnick & Fidell, 2007). Prior to undertaking the data analyses proposed in Chapter 2, a number of preliminary tests needed to be performed. The results of these tests and the subsequent analyses are described next.

4.2.1 Data Screening and Assumption Testing

The generation of sample frequencies and descriptives allowed for data screening to occur. There were no out-of-range values noted and the means and standard deviations were plausible. Missing data were only found for four participants on the social support questionnaire. Since the items left out were not going to be used in the main analysis, and because there was a relatively large amount of omitted data, it was decided that the missing

data would not be substituted, and their cases were not included in the descriptive analysis, through pairwise deletion.

Assumptions of univariate normality, linearity and homoscedasticity were tested for those variables that were to be used in the correlational analysis. Upon inspection of histograms it was observed that many of the variables were not normally distributed. Some skewness was to be expected, given the nature of the data, with variables tending to show skewness toward the functional end of the scale. Measures of skewness were obtained, and it was noted that three of the seven measures (antenatal bonding, postnatal bonding at six weeks and received social support in the antenatal period) had skews greater than -1.00. The most heavily skewed variable was that of received social support with a skew of -1.32. Scatter plots showed no signs of non-linearity but the assumption of homoscedasticity was somewhat violated for received social support. This finding was not so surprising, having already noted the presence of skewness in the same variable. However, these findings indicated that its inclusion in the analysis of both the correlations and the regression needed to be reconsidered.

Multiple regression assumes normality of the dependent variable, that there is a certain ratio of cases to independent variables, that issues relating to outliers and the existence of multicollinearity are dealt with; and that there is normality, linearity, homoscedasticity and independence of residuals.

Some skewness had been noted above for the dependent variable, postnatal bonding at six weeks. However, a one-sample Kolmogorov-Smirnov test indicated that the assumption was satisfied as the observed *p*-value (.608) exceeded the 0.5 level of significance required to accept the null hypothesis, allowing the data to be fitted by a multiple regression model.

The issue of the cases to independent variables ratio is related to the research design and was discussed in the power analysis section (Chapter 3, page 80) where the sample size was determined in such a way to ensure adequate power and effect size. Because a higher attrition of participants over time occurred than was originally estimated, sample size was slightly smaller than proposed (52 actual participants participated in both the first and second time point, compared to the 60 participants proposed by the sample size determination in the power analysis). This would of course mean that if the model were to be tested as proposed, the observed power *may* not be sufficient, particularly if the effect size was small. While it was still considered feasible to conduct the analysis with this number of participants, it must be noted that the results should be treated as preliminary. In an attempt to improve the observed power, it was decided that the regression model would also be tested without the independent variable of received social support, thereby decreasing the number of independent variables included in the model. The regression was run both ways and it was noted that the model fit was not improved in any way with the inclusion of the social support variable. For this reason the social support variable was not included in the multiple regression analysis reported below, seeing as its inclusion had previously been noted as questionable.

An analysis of outliers, both univariate and multivariate was carried out, and extreme cases were noted. Due to the relatively small size of the sample, the outliers were not removed immediately from the analyses. Instead, the analyses were carried out both with and without these cases. It was found that removing univariate outliers neither improved the Pearson *r* correlations to a significant level nor did it significantly improve the fit for the hypothesised multiple regression model. Diagnostic tools, including studentized deleted residuals, Cook's distances and Leverage values, were used to check for multivariate outliers and influential points. The removal of the three cases shown to be multivariate outliers did not significantly improve the fit of the model, but it somewhat increased the regression coefficient value.

There were no issues of multicollinearity noted. While it was observed that antenatal anxiety and antenatal depression were highly correlated (r =0.76, p = 0.000), this correlation was still lower than the recommended *r*-value of 0.80 used to assess independence of variables. As a further check collinearity statistics were also run, with tolerance levels not indicating evidence of multicollinearity.

Having removed the three cases that showed evidence of being outliers, the scatter plot of standardized residuals plotted against standardized predicted values indicated that the assumptions of multivariate homoscedasticity and linearity had been met. The normal probability plot indicated that the assumption of multivariate normality was not violated.

4.2.2 Determining Covariates

Since adolescents were recruited for this study across all three trimesters, it was important to consider the impact of gestation age on the variables to be tested. An independent samples *t*-test was carried out to compare the differences between those adolescents who were recruited in the third trimester of their pregnancy and those recruited in the first two trimesters. Each of the independent variables was compared. A significant difference was found in regard to maternal foetal bonding scores ($t(50) = 3.26$, $p = .002$) with those adolescents recruited in the third trimester having higher scores (*M*: 82.00, *SD*: 5.92) than those adolescents recruited during the first two trimesters (*M*: 73.49, *SD*: 8.75).

Longitudinal studies carried out across the trimesters have shown that foetal bonding increases over the period of the pregnancy (Cannella, 2005; Lindgren, 2001; Salisbury et al., 2003; Wayland & Tate, 1993). This appeared to also be the case with this particular sample, as indicated by the scatter plot in Figure 8 below.

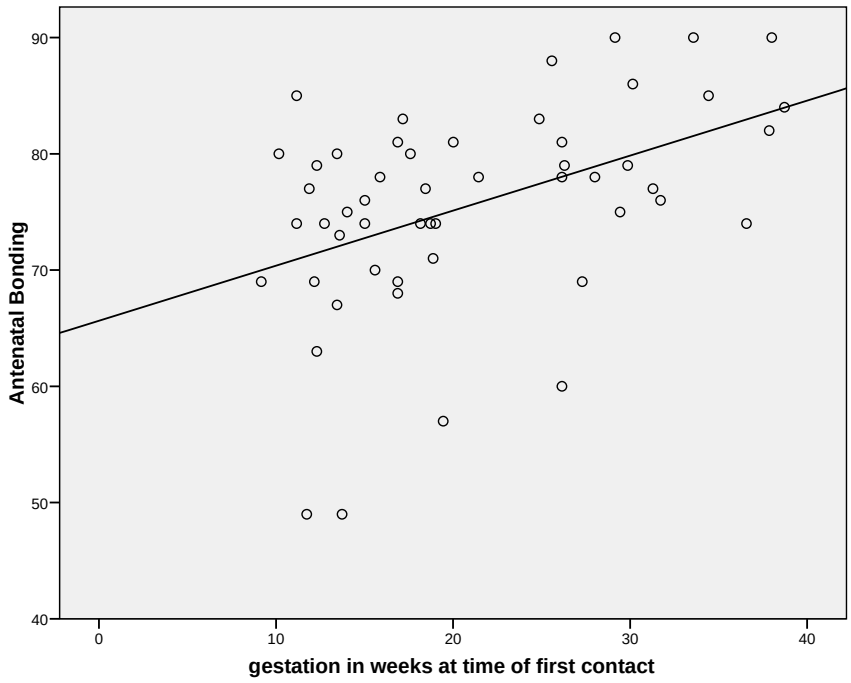

Figure 8. Scatter diagram: antenatal bonding by gestation

The diagram indicates a positive linear relationship between the antenatal bonding score and gestation in weeks. Based on this information a decision was made to include all adolescents recruited, including those recruited within the third trimester, but to control for gestation age when conducting the analyses.

Analyses were also conducted with other demographic variables to ascertain the existence of any other factors that needed to be controlled for in the main analysis. The following demographic variables were tested: educational level, employment, country of birth, primigravida status, previous termination, previous miscarriage, planned pregnancy, initial reaction to pregnancy, consideration of termination, feeling about impending

motherhood, current living situation, length in current living situation, partner is father of the baby, current relationship with mother. All demographic variables were considered with the dependent variable, though different tests were utilised according to whether the variable was categorical (using one-way analysis of variance) or continuous (using Pearson r correlations). None of the demographic variables were significantly associated with the dependent variable of postnatal bonding.

4.2.3 Bivariate Analyses

Pearson *r* correlations were run with the final sample to test a number of hypotheses relating to the association between each of the independent variables (antenatal bonding, maternal control, maternal care, anxiety, depression and received social support) and postnatal bonding at six weeks after controlling for gestation (Table 14).

Table 14
Pearson r Correlation Coefficients between All Variables, Controlling for Gestation (n=52)

Variable	1.	2.[a]	3.	4.	5.	6.	7.
1. Postnatal bonding (6 wks)	-	.40**	-.22	.18	-.17	-.08	.20
2. Antenatal bonding [a]		-	.05	.04	.11	.06	.12
3. Maternal control			-	-.52**	.33*	.29*	-.29*
4. Maternal care				-	-.41**	-.32*	.40**
5. Anxiety					-	.76**	-.48**
6. Depression						-	-.36*
7. Social support received							-

[a] Gestational age controlled for; df = 49
* p < .05. ** p < .01.

Of the six variables tested during the antenatal period and hypothesised to be associated with postnatal bonding at six weeks postpartum, only antenatal bonding showed a significant correlation. Contrary to expectation, maternal control, maternal care, anxiety during pregnancy, depression during pregnancy and received social support were not significantly associated with either antenatal bonding or postnatal bonding at six weeks, even when the correlations were re-run after having removed univariate outliers. There is however evidence of associations between all of these five antenatal variables measured. These and other correlations will be discussed in the post-hoc analyses section, page 106.

4.2.4 Multivariate Analyses

Further analysis was undertaken, in the form of multiple regression, to assess the relative contribution of the independent variables to postnatal bonding at six weeks. The original hypothesis proposed the inclusion of six variables – maternal control, maternal care, anxiety, depression, received social support and antenatal bonding. However, due to some violation of normality and homoscedasticity assumptions in the received social support variable, the multiple regression analysis was run without the social support variable. Gestation was introduced into the model as a covariate, due to its association with antenatal bonding. Furthermore, three cases which showed evidence of being multivariate outliers were also removed in an attempt to improve the fit of the model.

The multiple regression was otherwise run as hypothesised, using a hierarchical method, and three entry steps. Maternal control and maternal care were entered first, the

second block was composed of depression and anxiety, and antenatal bonding and gestation (covariate) were entered last.

Table 15 presents the results obtained when the multiple regression was run in this manner. The table displays the coefficients results of the hierarchical regression analysis including the unstandardised coefficients (*B*), the standard error of the regression coefficients (*SE B),* the standardised regression coefficients (Beta), the test statistics for the independent variables (*t*), the associated significance levels (*p*) and the increments of change (ΔR^2).

Table 15
Summary of Hierarchical Multiple Regression Analysis for Variables Predicting Postnatal Bonding (n = 49)

Independent variable	*B*	*SE B*	β	*t*	Sig. (*p)*
Step 1					
Maternal care	.152	.109	.238	1.390	.171
Maternal control	.042	.125	.058	.338	.737
Step 2					
Maternal care	.108	.117	.170	.929	.358
Maternal control	.070	.128	.095	.543	.590
Anxiety	-.166	.325	-.120	-.511	.612
Depression	-.101	.235	-.097	-.431	.668
Step 3					
Maternal care	.030	.101	.047	.294	.771
Maternal control	.019	.110	.026	.172	.864
Anxiety	-.407	.283	-.294	-1.435	.159
Depression	.015	.204	.014	.074	.942
Gestation in weeks	-.035	.084	-.059	-.422	.675
Antenatal bonding	.323	.079	.571	4.075	.000

Note: $R^2 = .045$ for Step 1; $\Delta R^2 = .033$ for Step 2; $\Delta R^2 = .283$ for Step 3.

Overall, the independent variables accounted for a significant proportion of the variance in postnatal bonding at six weeks (R^2 = .361; Adjusted R^2 = .269; $F(6,42) = 3.948$, p = .003). However, the output clearly indicated that postnatal bonding at six weeks was uniquely associated with antenatal bonding in this sample (β = .571, t = 4.075, p = .000) and that no other variable significantly added to the predictive power of the equation. In fact, the first two parts of the model were not useful in describing the data, thereby determining the proposed model a poor fit for the data obtained from this sample.

Subsequently, the regression analysis was re-run, using the enter method, and only including antenatal bonding (and gestation as a covariate) in the model. A significant model emerged in which antenatal bonding explained 27.3 per cent of the variance found in postnatal bonding at six weeks: (R^2 = .273; Adjusted R^2 = .242; F (2, 46) = 8.647, p = .001). Results of the regression are displayed in Table 16.

Table 16
Summary of Multiple Regression Analysis for Variables Predicting Postnatal Bonding From Antenatal Bonding and Gestation (covariate) (n = 49)

Independent variable	*B*	*SE B*	β	*t*	Sig. (*p*)
Antenatal bonding	.304	.079	.536	3.844	.000
Gestation in weeks	-.020	.084	-.033	-.238	.813

This model supports the hypothesis that postnatal bonding at six weeks is linearly related to antenatal bonding. The relatively large proportion of the variance in postnatal bonding at six weeks not explained by antenatal bonding indicates that there must be other factors influencing the development of maternal-infant bonding in the early postpartum

stage. Possible reasons for the lack of association of the other independent variables with postnatal bonding at six weeks are provided in the Discussion (Chapter 5, p. 131).

4.2.5 Testing of Indirect Relationships

Maternal foetal bonding was hypothesised to have a mediating effect on the relationship between each of the other antenatal factors and maternal infant bonding. However, for a mediating association to be tested a number of criteria needed to be met (Baron & Kenny, 1986). In this case none of the independent variables (maternal care, maternal control, depression, anxiety and received social support) were significantly related to antenatal bonding (the proposed mediator) or postnatal bonding at six weeks (the proposed dependent variable). Consequently the conditions required for a mediated relationship were not satisfied and hypotheses 7 – 11 describing the possibility of the presence of indirect relationships were not supported.

4.2.6 Post-hoc Analyses

Further post-hoc testing of relationships between variables was undertaken. The demographic data were analysed using one-way analysis of variance to test whether they influenced any of the parametric variables. Relationships between all the continuous variables were explored using scatter plots and Pearson r correlations.

Three demographic factors were noted to be of particular interest as they provided meaningful significant results. Specifically, significant differences in antenatal bonding means were noted for the initial reaction to the pregnancy (ranging from totally positive to totally negative), $F(2,49) = 3.531$, $p = .037$ and confidence about impending motherhood (ranging from very confident to very unconfident), $F(4, 47) = 7.882$, $p = .000$. Those participants who reported to have felt "totally positive" about the pregnancy also reported higher mean antenatal bonding scores ($M = 79.74$, $SD = 6.20$) compared to those who had mixed or only negative feelings combined ($M = 73.24$, $SD = 9.42$). Similarly, the average antenatal bonding score was higher for those participants who felt more confident (very confident and confident combined) about becoming a mother ($M = 77.95$, $SD = 7.01$) than for those reporting lower confidence ($M = 69.29$, $SD = 10.56$).

A third factor – current relationship with own mother – showed significant differences for depression, $F(5, 46) = 4.671$, $p = .002$ and anxiety, $F(5, 46) = 3.551$, $p = .008$, but not with antenatal bonding. No statistical post-hoc tests were carried out due to the low numbers in some of the groups. However, inspection of the means in each of the categories (see Table 17) clearly indicated that those adolescents who experienced warm, close relationships with their mothers had lower anxiety and depression scores compared to those who reported poor or hostile relationships with their mother. As a group those who reported no contact with their mother (n=3) reported the lowest anxiety and depression scores.

Table 17
Mean and Standard Deviations for Depression and Anxiety Scores for Each Category of Current Relationship with Own Mother

	n	*Mean*	*SD*
Close relationship	29		
Depression		8.03	4.07
Anxiety		5.72	3.14
Fair relationship, reasonably warm	13		
Depression		7.77	4.15
Anxiety		5.69	3.33
Poor relationship, not particularly warm	3		
Depression		16.33	5.03
Anxiety		12.00	3.61
Very poor relationship, cold and hostile	1		
Depression		21.00	-
Anxiety		12.00	-
No contact	3		
Depression		6.00	4.36
Anxiety		3.33	4.16
Mother not alive	3		
Depression		12.00	4.36
Anxiety		9.33	4.73

A Pearson *r* correlation matrix (controlling for gestational age for those correlations including antenatal bonding) including all the non-descriptive variables tested throughout the study, was generated and revealed the presence of a number of significant relationships that were not the focus of the main analyses (Table 18). Significant associations were found among the five antenatal variables – maternal care, maternal control, depression, anxiety and received social support. The only antenatal variable not correlated with other variables measured during pregnancy was foetal bonding. It is to be noted that while social support was included in the correlation, the coefficient values need to be interpreted with great care, due to the assumption violations of normality and homoscedasticity described above. Directions for each of the correlations can be noted from Table 18.

Table 18

Pearson r Correlation Coefficients between All Variables (r=Pearson r correlation, p=sig.)

Variable		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Antenatal bonding [a]	*r*		.043	.045	.110	.057	.121	.404**	.139	.154	.201	.048	.168
	p	-	.765	.755	.443	.689	.399	.003	.329	.282	.170	.747	.253
	df		49	49	49	49	49	49	49	49	46	46	46
2. Maternal care	*r*			-.519**	-.406**	-.323*	.399**	.178	-.258	-.100	.105	-.168	-.064
	p		-	.000	.003	.019	.003	.206	.064	.484	.472	.248	.664
	n			52	52	52	52	52	52	52	49	49	49
3. Maternal control	*r*				.333*	.292*	-.291*	-.221	.444**	.253	-.190	.347*	.179
	p			-	.016	.036	.036	.116	.001	.071	.191	.014	.219
	n				52	52	52	52	52	52	49	49	49
4. Antenatal anxiety	*r*					.760**	-.481**	-.172	.653**	.501**	-.318*	.467**	.448**
	p				-	.000	.000	.223	.000	.000	.026	.001	.001
	n					52	52	52	52	52	49	49	49
5. Antenatal depression	*r*						-.364*	-.080	.540**	.431**	-.183	.394**	.508**
	p					-	.008	.572	.000	.001	.209	.005	.000
	n						52	52	52	52	49	49	49
6. Social support received	*r*							.200	-.316*	-.186	.238	-.238	-.145
	p						-	.156	.023	.187	.099	.099	320
	n							52	52	52	49	49	49
7. Postnatal bonding	*r*								-.445**	-.449**	.734**	-.404**	-.259
at six weeks	*p*							-	.001	.001	.000	.004	.072
	n								52	52	49	49	49
8.Postnatal anxiety	*r*									.819**	-.575**	.796**	.738**
at six weeks	*p*								-	.000	.000	.000	.000
	n									52	49	49	49
9. Postnatal depression	*r*										-.515**	.690**	.800**
at six weeks	*p*									-	.000	.000	.000
	n										49	49	49
10. Postnatal bonding	*r*											-.579**	-.428**
at twelve weeks	*p*										-	.000	.003
	n											49	49
11. Postnatal anxiety	*r*												.752**
at twelve weeks	*p*											-	.000
	n												49
12. Postnatal depression	*r*												
at twelve weeks	*p*												-
	n												

[a] Gestational age controlled for

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

Relationships between antenatal and postnatal factors were less common. As noted earlier, antenatal bonding was the only antenatal variable to be related with postnatal bonding at six weeks. Antenatal anxiety showed a small but nevertheless significant correlation with postnatal bonding at twelve weeks (r = -.318, p = .026).

Correlations generated for the postnatal factors at each time point (six weeks postpartum and twelve weeks postpartum) also showed evidence of significant relationships (see Table 18 for Pearson r correlation coefficients). At both time points, postnatal bonding was negatively related to postnatal anxiety and postnatal depression, measured in the same instance (Figure 9).

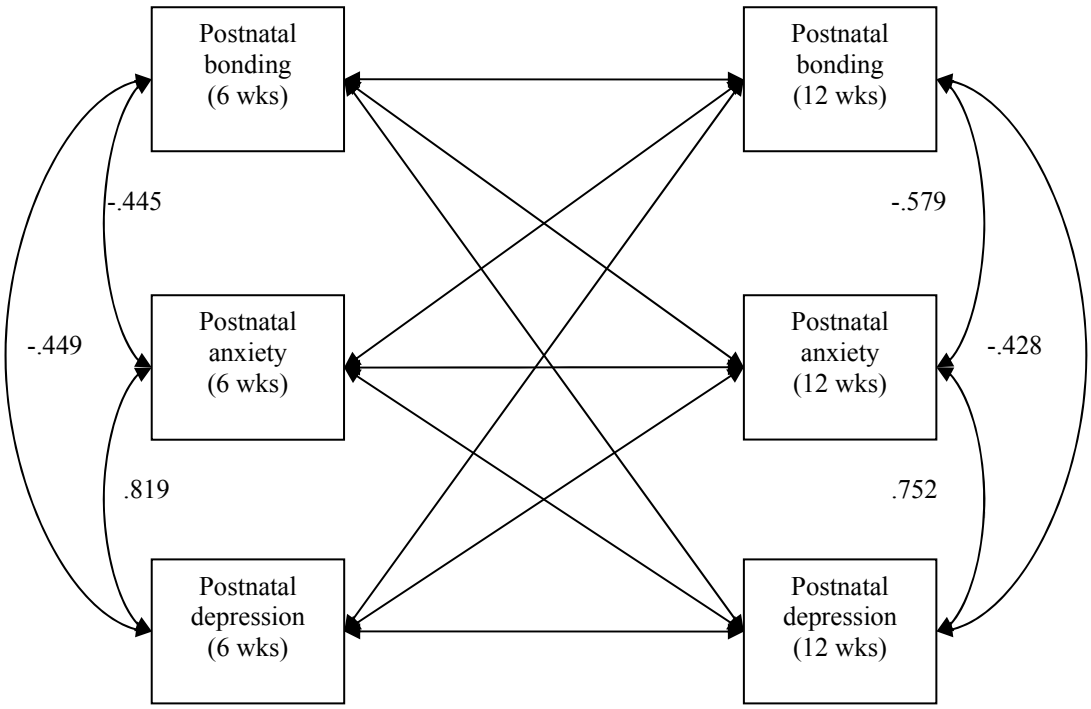

Figure 9. Diagram indicating multiple relationships among variables in the postnatal period and reporting significant Pearson *r* correlations among postnatal variables measured concurrently

Of particular interest was the interrelationship among anxiety and depression factors across all three time points (antenatal period, six weeks postpartum and 12 weeks postpartum). The correlation coefficients ranged between .394 and .819 (p <0.01); indicating the existence of moderate to strong relationships between anxiety and depression across time. The high multicollinearity was particularly evident between anxiety and depression during the postnatal period, which would make inclusion of both variables into a regression analysis problematic.

It is also worth reporting the correlations among the bonding variables. While a significant moderate relationship was noted between antenatal bonding and postnatal bonding at six weeks (r = .404, p = .003), and a significant strong relationship appeared between postnatal bonding at six weeks and postnatal bonding at twelve weeks (r = .734, p = .000); the relationship between antenatal bonding and postnatal bonding at twelve weeks was non-significant.

4.3 Exploring Beliefs

After completion of the antenatal questionnaires, semi-structured interviews using open-ended questions (see Appendix H) were conducted with each adolescent. Questions were asked about familial religious and cultural beliefs. The interviews varied in length from five minutes to twenty minutes, depending on how much information the adolescent was willing to provide. Of particular interest was any information relating to the fact that these women were pregnant in their teens. For the most part, adolescents consented to providing some general comments about their religious and cultural beliefs, as well as initial reactions to the news of the pregnancy. Only one adolescent declined to describe her religious beliefs. Some adolescents chose to expand and give examples and details, whereas others tended to keep their answers short, and often required further probing with more structured, close-ended questions.

Interviews were carried out with 58 adolescents. Since the interview data were not used in the main analysis, all the interviews were included in the report, including the interviews of those who did not participate in the later postnatal data collections.

Topics for discussion were set out as per the interview schedule, though some new themes emerged during the process of collating the data. The resulting description reflects general comments and statements of interest made by this group of pregnant adolescents. Comments covered a wide range and similarities and differences within the group are noted; there is no attempt to generalise these responses to a wider population.

4.3.1 Nationality and the Impact of Culture

The demographic information previously reported indicated that while three quarters of the sample were born in Australia, nearly half the sample indicated that they had a non-Australian ethnic background.

Based on these interviews, 16 adolescents were born overseas and had moved to Melbourne during their childhood, in the majority of cases with their family-of-origin. Two of the women had moved following their pregnancy because of reasons related to their pregnancy. Seven of the pregnant women were born in New Zealand of Maori background, two in Malta, two in Sudan, and one woman in each of the following countries: Bangladesh, Chile, Indonesia (of Vietnamese background), Pakistan and the Philippines. When asked whether their ethnicity impacted in any way on how their pregnancy was viewed, some adolescents found it hard to distinguish between their religious and cultural beliefs. Others spoke about their country of birth as being more traditional in its views. One Maltese adolescent moved to Melbourne with her father because of worries about the gossip that would ensue if she had a child out of wedlock in Malta. The woman born in the Philippines stated that despite Filipino values being "*traditionally pretty strict*", she felt that her family was more lenient because they had lived in Australia for some time, implying an element of Australian acculturation. This was not the case for the two Sudanese adolescents, who despite having been in the country for a number of years, still received many negative reactions from their family and friends. Both described feeling under

pressure because they were not married, and one said that she had lost all forms of support from family and friends after having been disowned. None of the women from New Zealand were able to identify any influences of the Maori culture on their pregnancies. One New Zealander commented that "*pregnancy at an early age happens [*to NZ women*]… it's not encouraged but common*".

Another 17 women in this sample were born in Australia but had either one or both parents born overseas. All of these adolescents stated that to a certain extent they identified with a non-Australian background – in some cases this was demonstrated through use of a language other than English in the home, or attendance at festivals, dances or cultural events held with other members belonging to that culture. For those women who had both parents born overseas, the identification with that country was stronger, than for those who only had one parent born overseas. These women did not generally report that their parents' cultural background had a strong impact on the reactions towards their pregnancy. For two young women a parent was disappointed because the adolescent's partner (and father of the baby) was not of the same ethnicity.

For those women born in Australia, of Australian parents, there was not the option of comparing two cultures, which made it harder to elicit information from the adolescents as to the impact of culture on their pregnancy. It is also of note that only one woman recruited in the study was of a Vietnamese background, despite the relatively large proportion of Vietnamese families living in the Western Suburbs (Australian Bureau of Statistics, 2007).

4.3.2 Religion and the Impact of Religious Factors

Participants could be divided into three main categories – those who had been brought up not practicing any religion (34%), those who considered their family or just themselves to be non-practicing (28% and 12% respectively), and those who considered themselves to be active members of their religious faith (26%). Responses from those who identified themselves as "non-practicing", generally indicated that there was no (or very limited) church attendance; though in some cases personal prayers or beliefs were seen as substitutes for this lack of attendance. It was noted that all the young women who considered themselves and/or their families to be non-practicing belonged to one of the Christian denominations.

The women who stated that they actively practiced their faith belonged to different religions. Five women were Muslim, four were Catholic, one woman was Greek Orthodox, another was Jehovah's Witness and another was Jewish. Three other women stated that they were Christian but did not identify a particular denomination. Three women within this sub-group had made a personal choice as an adolescent to change their religion.

The adolescents who identified a religion, regardless of whether they were practicing or not, were asked further questions as to whether their religious beliefs, or those of their parents, had been raised as a factor or influence since their pregnancy. Of these, 20 women (34%) gave responses indicating that there had been some influence based on religion.

4.3.2.1 Muslim religion

Those women who identified themselves as having a Muslim faith came across as a homogenous group. All five women described themselves as being very active in their religion, and saw their faith as being a strong driving force in their life. One woman stated that "*everything I do is led by religion*". Despite having different ethnic backgrounds, four women were brought up in the Muslim belief system. It was stated by these women that within the Muslim faith, provided that a woman is married, pregnancy is encouraged. All four women were married, and described having both immediate and extended family members who were extremely supportive. For these women becoming pregnant was encouraged by their family members and husbands. Two of these women initially described feeling some uncertainty about the pregnancy because of their age, because they were still studying and the pregnancy was not planned. However both stated that with encouragement and support from their family, they began to feel positive about having a baby.

The situation was slightly different for two other women who came from non-practicing Catholic families. These women had partners who were Muslim and thereby became interested in the Muslim religion. Neither of their pregnancies was planned. One of these women chose to convert to Islam prior to her pregnancy, and stated that she had a lot of support from family and her partner. The second woman was in the process of learning more about the religion and was considering converting to Islam at the time of the

interview. She described how while her own family was accepting of her pregnancy, despite the initial shock; it had been harder for her partner as his parents had been "*offended that we were not married and having a child*" as well as because she did not belong to the same ethnic or religious background that he did.

4.3.2.2 Christian Religion

The main issue raised among the group of adolescents who reported being Christians was the expectation within any of the Christian denominations that a woman is married before having a child. Becoming pregnant out of wedlock was commented on by many within this group regardless of whether the woman and/or her family was a practicing Christian or not; but it was manifested in different ways. One adolescent was worried about telling her parents as she was unsure of what their reaction would be. While some adolescents still found support from their families and the community, one described feeling that she had been cast away by all. In another situation, the adolescent's immediate family accepted the situation, but the grandparents who were more religious, struggled with the idea. Another adolescent stated that since the pregnancy, her family, who continued to practice their faith, began attending services at a different church where they felt more comfortable, as they found their own community to be more judgemental.

Not all the comments made were negative. The adolescent who changed churches, found the new community to be accepting, as did another adolescent who was engaged but not married. A Greek Orthodox woman chose to marry her partner, following suggestions

made by the families and their priest. A third woman stated that she found her community to be supportive, and she had only been advised against having an abortion. Two women who considered themselves to come from non-practicing families expressed a wish to have the baby christened, and one other who had been non-practicing, on becoming pregnant chose to become more involved in her faith by attending a youth group and engaging in bible study.

4.3.2.3 Jewish Religion

Only one adolescent adhered to a Jewish faith. She described herself as a "Traditional Jew" as opposed to Orthodox, where one of the differences included an acceptance of pregnancy out of wedlock. However, this adolescent reported that she was faced with some difficulty because the father of the baby was not Jewish, which was not tolerated by some of the older and more religious members of the community, and this eventually led to the pregnant adolescent having to move house to live with her father after her mother disowned her.

4.3.3 Own Reaction to the Pregnancy

The adolescents were asked about their own initial reactions to the pregnancy. Those women who stated the pregnancy was planned described positive emotions such as happiness, joy and excitement. Some adolescents stated that the pregnancy was "*kind of*

planned", and these women also stated that their initial reaction was positive, and used words such as "*happy*" and "*rapt*". One woman stated that she had wanted a baby and had been trying to get pregnant for a while, while another had told her boyfriend that she was "*ready*". Another woman also described her pregnancy as "sort of" planned, and stated that she had wanted to become pregnant, "*but not at this time*" as she wanted to complete her studies first.

For those adolescents who stated that the pregnancy was unplanned, the range of emotions was wider. While some women said that they initially felt sad, angry and cried about the situation, some others stated they initially had mixed feelings or were happy and excited about having a baby, despite the pregnancy being unplanned. The latter was particularly so for one woman who thought she could not have children.

Many described initial feelings of shock and surprise as the pregnancy was unexpected and they had not given any thought to having children at this stage in their life. Some of these women stated that they were scared – scared about what the future would hold and how their parents and family would react. Others described feelings of confusion about what to do (including for some whether to keep the pregnancy, terminate it, or give the baby up for adoption after birth), worries about whether they would be able to cope as a new mother, panic about the unknown, nervousness about financial and accommodation issues, and concerns about being too young or about losing their independence.

Many of the adolescents chose to also mention how their reaction changed, with all of them stating that as their pregnancy continued they began to feel more positive about

having a baby. A large majority of the women said that they generally felt happy and accepting of the pregnancy at the time of the interview. Some said that this change of emotions occurred after letting their family know about the pregnancy, particularly if telling the news "*came out good*" and they began to receive support from others. The shift in emotions also appeared to occur due to intrinsic factors, such as a feeling that they would be able to cope in the new role and be "*fine as a young mother*". Furthermore, as a result of the pregnancy some adolescents felt that they shifted their own outlook on life by becoming more responsible and mature, focusing on what they considered to be more important issues, such as family and studies as they prepared for their new role as a mother. This was described by one adolescent as "*being pregnant grounded me*".

4.3.4 Partner's Reaction to the Pregnancy

The adolescents reported that their partner's reaction was often similar to their own. Initial emotions about the pregnancy ranged from an inability to deal with the reality of the news, to shock and worry about raising a child, to happiness and pleasure at the idea. A few of the adolescents stated that they felt that their partners had dealt with the news better than they had, showing more positive emotion initially. Two women with older partners expressed the opinion that because of being older their partners were more ready to accept the role of parenthood. In many cases the adolescents stated that their partners were a source of support, and two of the women moved in with their partner and his family following the news of the pregnancy. Like the pregnant women themselves, some of their partners made reference to age-related concerns.

Eleven adolescents were no longer with the father of the baby at the time of the interview but most of them reported that the break-up of the relationship was unrelated to the pregnancy. While not all the women chose to reveal the reason for the break-up, one stated there had been problems in the relationship prior to the news of the pregnancy; a second reported that her boyfriend had been cheating on her; and a third that her boyfriend was abusive. Of the four women who reported that the pregnancy had been the cause of the break-up, two of them made it clear that the break-up had been initiated by the partner. In one case the partner said he wanted nothing to do with the baby, and in another, the partner left the adolescent for another woman. A third stated that her boyfriend had acted in a "*weird and immature*" manner since he found out about the pregnancy, which she suggested was because he found the news "*surreal*".

One adolescent stated that the opposite had happened for her, where problems in her relationship with the father of the baby were worked through following the news of the pregnancy. In another case, the pregnant woman was uncertain whether her current partner was the father of the baby, but that the partner who had been informed of this doubt, had managed this well, and was still with the woman.

4.3.5 Parents' Reactions to the Pregnancy

According to the adolescent accounts, the parents' initial reactions to the pregnancy were not often different to their own. Descriptions of shock and initial feelings of

unhappiness or disappointment were common, though the women stated on many occasions, the parents eventually became more accepting, and continued to offer their support, despite the parents' own misgivings and concerns about the matter. Some adolescents said that their parents were happy, calm or "OK" with the news. Less frequently, some parents were reportedly angry, and for four women there had been no contact with their mother, as a result of the pregnancy.

Some parents voiced their opinions to their daughters – two adolescents said that they were asked by their parents to have an abortion, and one was told that she should keep the baby. Other parents talked through the various options available with the adolescent, while one set of parents tended to avoid the subject.

A small number of the pregnant women said that their mothers showed understanding of their situation. This was particularly so for those adolescents who stated that their own mothers or other family members had also had children at an early age.

The most commonly reported concerns that the parents had for their daughters were mainly related to the adolescent's age. Some believed their daughter was too young to be having a baby, and were worried that she may not be able to cope with the motherhood role. Other parents seemed to have some expectations (such as completion of studies) of their daughter that were not going to be fulfilled as a result of the pregnancy. Such comments appeared to be more likely made by the father of the pregnant woman. As one adolescent described, her father "*had a sequence of events – to do things before starting a*

family". Another stated that her father believed that "*you should study and make a career first*".

Another concern that emerged from the parents was the belief that the father of the baby was an unsuitable partner. For two women this was due to a difference in age between the adolescent and her (older) partner, but for one woman the partner's unsuitability was based on religious or cultural differences.

For some women who were interviewed, the issue of becoming pregnant before marriage was also raised by either the mother or the father. Two adolescents were married during the pregnancy but for two other adolescents this was not possible as on learning of the pregnancy the boyfriend had left the relationship.

4.3.6 Negative Reactions of Others to the Pregnancy

To gain some understanding as to whether adolescent pregnancy was viewed with some stigma within this sample, participants were asked whether they had come across any negative reactions from people in their community. Some adolescents felt that people had reacted to the pregnancy better than they had expected in that they were supportive and happy for them. However, close to half of the sample had experienced some negative reactions from people other than their family or partner. In the majority of cases, such judgements were only passed by a few people in each adolescent's life. Only in three cases

were the women subjected to negative reactions from a large number of people within their community, leaving them without support and with feelings of having been ostracised.

Many of these women described having friends who were shocked at the news, or expressed disbelief or disappointment. Specific comments and references about the adolescent's age were made in a number of situations, with some adolescents being told that they were "*too young*", that they were stupid, immature or making a mistake, and that their lives were going to be ruined; while other people wondered why the adolescent would keep the baby. In some cases people's attitudes relating to religious and cultural beliefs were judgmental, placing pressure on these adolescents, particularly in cases where the woman was unmarried. Some adolescents received "*dirty looks*" from either friends or strangers particularly when the adolescent was in a school environment or wearing her school uniform. Gossip and rumours spread by friends or neighbours was another factor that the adolescents in this sample noted, including some name-calling, such as "*slut*". The opposite was also noted by some, where a decision had been made either by the adolescent herself or others to not talk about the pregnancy. One woman stated that half her friends did not know about the pregnancy. In another case, a participant described how some family friends had chosen not to tell their children that she was pregnant, as it went against their religious beliefs. In what was felt by the adolescents who described it to be a more severe reaction, some people had broken ties with them upon finding out about their pregnancy, and had chosen to stop socialising or talking to them.

4.3.7 Changes Made

Adolescents were asked about any changes they had made since becoming aware of the pregnancy. For many, the changes made were described as "Lifestyle" changes, with the majority of those who made any changes stating they had quit drinking and smoking, begun to eat more healthily and had stopped going out at night with friends. The changes made and the number of adolescents who made such changes are listed in Table 19 below.

Table 19
List of Changes Made Because of the Pregnancy

Change made	No. of adolescents who reported this change
Stopped going out (in relation to Nightlife)	12
Stopped drinking	11
Tries to eat healthier / take vitamins	11
Quit or significantly reduced smoking	10
Spends less time with her friends	6
Feels she is more mature / responsible	5
Moved house / moved out	5
Focused more on her studies	4
Reduced / stopped study	2
Stopped working	2
Moved to Melbourne from overseas	2
Wears different types of clothes	2
Plans for the future	2
Stopped dance / sports activities	2
Learning to cook / do housework	1
Manages time better	1
Made new friends (with other mothers-to-be)	1
Stopped taking drugs	1
Has become more independent / making her own choices	1

The majority of the changes listed involved a shift towards healthier living, such as eating better and quitting smoking, alcohol or drugs. Other common changes related more to the restrictions of pregnancy, such as an inability to continue dance or sports activities, to go out to clubs or bars at night, spend time with friends, or maintain full time work or study. A third modification involved what could be considered preparation for the motherhood role, including making plans for the future, becoming more mature and responsible, and an attempt to focus on completing studies.

4.3.8 Traditions

Some of the adolescents volunteered information about a tradition or superstition that had been raised in relation to their pregnancy or forthcoming birth of the baby. The traditions, for the most part, stemmed from cultural or religious beliefs. Two women stated that they had planned a baby shower and another two women who held Catholic beliefs stated they wanted to get their child baptised. A woman of Chilean descent described a superstition that if the woman's face puts on weight during the pregnancy, then the baby would be a girl. A Sudanese woman explained a cultural tradition of burning Sandalwood in the home to let visitors know that someone in the house is pregnant. A woman of Vietnamese background spoke about the importance of taking care of the health of the mother and baby immediately after the birth as the bodies are considered to be very vulnerable and so need more care. She stated that lots of support is provided by family and friends during this period to make sure that the mother keeps warm, does not touch water very often and eats as healthily as possible.

5 Discussion

5.1 Rationale Review

Adolescent pregnancy and adolescent motherhood are commonly associated with negative outcomes for the woman and her child. However, relatively little research has been carried out with this population to understand the psychological factors involved. There is a particular paucity of research in relation to the examination of predictors of maternal bonding in adolescent mothers. Yet some adolescent mothers have been found to be at risk of developing sub-optimal relationships with their infants (Elster et al., 1983; Lesser et al., 1999; Sartore, 1996; Stier et al., 1993). Studies carried out with non-adolescent mothers have reported relationships between low levels of maternal bonding and low maternal antenatal bonding, maternal representation of early childhood experiences, the presence of depression and anxiety, and low levels of appropriate social support (Condon & Corkindale, 1997; Mercer & Ferketich, 1990; Muller, 1996; Slade et al., 1999; Williams et al., 1987). While not directly linked to maternal infant bonding, research carried out with pregnant and parenting adolescents has identified the occurrence of these factors for these young women (Barnet et al., 1996; Brage Hudson et al., 2000; Lesser et al., 1999; Milan, Ickovics et al., 2004; Milan, Lewis et al., 2004; Quinlivan et al., 2004; Rhodes et al., 1994).

The primary aim of this study was to investigate the factors that were hypothesised to influence maternal bonding in adolescent mothers at six weeks and three months postpartum. Namely, these factors included antenatal bonding, maternal care and maternal

control (as a measure of the adolescent's own experience of being mothered), anxiety and depression occurring during pregnancy, and the amount of social support received during the antenatal period. The study also collected information on the different cultural and religious beliefs held by the adolescents and their families.

Identifying correlates and predictors of maternal bonding in adolescent motherhood was considered to be important because such knowledge can then be utilised to develop appropriate assessments and interventions, so as to better provide support for young mothers when needed. Information on the cultural and religious beliefs of the pregnant women allowed for a preliminary insight and exploration of how various beliefs impacted on the experiences of these adolescents.

5.2 Evaluation of the Result Findings

The data analyses carried out and described in Chapter 4 produced a number of findings. The following sections attempt to understand the results by placing them in context and evaluating them against previous research.

5.2.1 Comparing Demographic Factors

Background and demographic information was collected for this group of primiparous pregnant adolescents. A summary of this information is provided here, together with a comparison to the demographic information described in two other recent Australian studies carried out in Melbourne (Aiello & Lancaster, 2007; Quinlivan et al., 2004).

The mean age at time of recruitment for the pregnant adolescents in this study was 18 years 4 months (*SD* = 1 year 5 months). This mean age was identical to that of Aiello and Lancaster (2007), while Quinlivan et al. (2004) reported a slightly lower mean age of 17.5 years. In the current sample, 17% had experienced a previous pregnancy (12% had undergone a previous termination of pregnancy, 6% experienced a miscarriage or stillbirth). In contrast, Aiello and Lancaster, who also recruited a primiparous sample, reported a higher proportion of non-primigravida women at 26.8% (15.7% reported a termination, 12.9% experienced a miscarriage, 1.8% experienced both). Schooling and unemployment

means were similar for the two groups. The number of adolescents who, at recruitment, were in a relationship with the father of the baby was also equivalent across the two studies. Aiello and Lancaster reported a slightly higher percentage of pregnant adolescents living with either or both of their parents compared to that found in the current study.

While these comparisons do not assure that the current sample is wholly representative of the primiparous pregnant adolescent population in Melbourne, it does provide some indication of consistency of the samples recruited across different areas of Melbourne.

Information was also collected on the participants' ethnic backgrounds. The ethnic spread has been shown to vary according to the geographical area, making comparisons hard. While the current study recruited women mainly living in the Western suburbs of Melbourne, Aiello and Lancaster (2007) recruited their sample from a hospital in the South-Eastern Region of Melbourne. However, the proportion of Australian born and Australian ethnicity was similar in both the current study and Aiello and Lancaster's earlier study. The main difference noticed in regard to ethnicity was that Aiello and Lancaster reported that one fifth of their sample was of Asian background in contrast to the current study where there were no adolescents of Asian background in the final sample. This distinction is noteworthy, particularly because the Australian Bureau of Statistics 2006 Census data (2007) list Vietnamese as the fourth most commonly reported ancestry by country of birth of parents for the Outer Western region of Metropolitan Melbourne. The finding is however not completely surprising, as other reports exist of low Asian adolescent birth rate (The National Campaign to Prevent Teen Pregnancy, 2007; Quinlivan et al., 2004).

5.2.2 Predicting Maternal Bonding

The multivariate model initially proposed to predict maternal infant bonding at six weeks (see figure 2, p. 57) was not a good fit for the data obtained from this sample. In fact, of the six variables hypothesised to be predictors of postnatal bonding only antenatal bonding was significantly related to maternal infant bonding at six weeks. The latter relationship continued to be significant, even after controlling for gestational age. Similarly to other studies that have reported a relationship between antenatal and postnatal bonding (Mercer & Ferketich, 1990; Muller, 1996; Williams et al., 1987), only some of the variance in maternal infant bonding at six weeks was explained by antenatal bonding, suggesting that other factors were also involved in the development of postnatal bonding.

In fact, research carried out, primarily with adults, has found links between aspects of the mother-infant relationship (categorised as any of maternal infant bonding, maternal interactions, maternal behaviour, and maternal adjustment) and antenatal factors such depression, anxiety and social support (Clemmens, 2001; Colletta & Gregg, 1981; Mercer & Ferketich, 1990; Milan, Lewis et al., 2004; Webster et al., 1994). In contrast, in the current study, the following variables measured during the antenatal period – upbringing experiences (measured through maternal care and maternal control), depression, anxiety and social support – did not show evidence of being related to either antenatal or postnatal bonding.

A number of reasons could be suggested to explain the absence of expected associations. A lack of significant results could be due to a number of limitations including the small sample size and the reliance on self-report measures for data collection. The influence of such limitations on the research findings is described in more detail in section 5.4 (p. 154). Furthermore, it was also noted that the dependent variable – postnatal bonding – demonstrated a restricted range when compared to that reported in other studies. Table 20 provides MPAS descriptives for this study and corresponding results from two other Australian studies.

Table 20
Descriptive Statistics of the MPAS for Three Australian Studies

Study	Sample	Time point	Mean	Standard deviation	Range
Current study	Adolescent	6 weeks	85.42	5.13	72.3 – 95.0
		3 months	85.94	4.89	74.7 – 95.0
Aiello & Lancaster (2007)	Adolescent	8 weeks	81.48	7.15	-
		6 months	79.75	8.41	46.7 – 93.7
Condon & Corkindale (1998)	Adult	4 weeks	82.9	7.6	56 – 95
		4 months	84.6	7.0	59 – 95

While direct comparisons cannot be made, as data collection occurred at slightly different time points, it is clear that while the mean scores of the three samples are similar, the dispersion is smaller in the current study. It is to be noted that the range reported above for the current study excludes three cases which were deemed to be outliers. When these three cases were included, the dispersion ranged from 60.2 – 95.0 at six weeks postpartum. However, inclusion of these cases in the multivariate analysis was not warranted, as it did not improve the model fit and decreased the regression coefficient value. The implication

of a restricted range is that the *r* value may have been underestimated so that evidence of possible relationships may have been masked. One possible explanation as to why the range was restricted is response bias, with adolescents choosing to respond in a socially desirable manner. However the latter is only speculation and unfortunately cannot be confirmed for this study.

While a restricted range may be a possible explanation for the lack of significant findings between many of the examined antenatal factors and postnatal bonding, this reason cannot be applied to the lack of associations between the same antenatal factors and antenatal bonding. Antenatal bonding scores obtained in the current study showed a similar spread to those reported in Condon's (1993) paper that reported on the development of the instrument. Further consideration to understanding these results is presented below.

5.2.3 A Hypothesis: The Different Facets of Bonding

The main results of this study show that antenatal bonding was associated with postnatal bonding at six weeks and three months postpartum, but that no other antenatal factors tested were associated with maternal bonding at either the antenatal or postnatal period. Yet, depression and anxiety measured at six weeks and twelve weeks postpartum were associated with concurrent measures of bonding. Consideration of these findings is important to better understand the development, correlates and possibly predictors of bonding. In particular, it is necessary to consider why despite the shared variance between antenatal and postnatal bonding, and the correlation between postnatal bonding and

postnatal depression and anxiety, antenatal bonding was not associated with depression and anxiety at any of the time points. It is also not clear why depression and/or anxiety measured during the antenatal period failed to predict postnatal bonding even though each of the two maternal mental health variables (anxiety and depression) had moderate correlations over time and the same measures used in the postpartum period yielded scores that were related to the same outcome variable. Some possible explanations are offered below.

One reason for the non-significant findings could be due to variation in the definition, conceptualisation and measurement of what constitutes the maternal bond. The literature available on the topic of maternal bonding has indicated the lack of consensus among researchers on the conceptualisation and operational definition of bonding (See sections 1.3.2 and 1.3.3 p. 14 – 17 for a review). There have been different terms used to describe the experience, variations in its definition and the operationalisation of the concept through varying measures. These factors make comparison of different studies extremely difficult. Researchers such as Condon (Condon, 1993; Condon & Corkindale, 1998) who have examined the concepts of antenatal bonding and postnatal bonding have actually developed different questionnaires to measure the concept before and after the birth implying that antenatal bonding and postnatal bonding are not identical.

Further complicating the ability to understand and conceptualise bonding is the fact that bonding appears to occur as a changing and evolving process over time. Support for this has emerged in previous studies and in the current study. The emergence of bonding has been shown to occur during the antenatal period (Condon, 1993; Erickson, 1996; Klaus

& Kennell, 1982; Muller, 1996; Williams et al, 1987) and to develop over the period of the pregnancy. The current study together with other literature (Condon, 1993; Lindgren, 2001; Salisbury et al., 2003; Wayland & Tate, 1993) noted that antenatal bonding was positively related to gestation, with changes occurring in the quality as well as the quantity of the bond (Condon, 1993).

In contrast to the qualitative and quantitative changes that occur in the bonding process during the antenatal period, results from the current study show more stability in postnatal bonding suggesting that the two concepts may indeed be related but not identical. In fact evidence of a link between antenatal bonding and postnatal bonding is still contentious. As noted in the literature review, some studies have reported a significant relationship between the two whereas others have not. In the current study antenatal bonding was only significantly correlated with postnatal bonding at six weeks postpartum and not at the three month time point. This finding is similar to that of Mercer and Ferketich (1990) who found that antenatal bonding only predicted postnatal bonding directly in the early postpartum period. They suggested that "attachment to the fetus during pregnancy does not necessarily indicate parental attachment to the growing infant" (p. 277).

A number of hypotheses could be generated to explain this. One such theory is that while bonding is being measured at both the antenatal and postnatal periods, there is a difference between these concepts as during the antenatal period (particularly towards the beginning of the pregnancy) the bond to the foetus is created out of the woman's emotions and thoughts towards an imagined baby. In fact, Condon (1993, p. 168) described the antenatal bond as being characterised by an "admixture of fantasy and reality, the foetus

being a recipient par excellence of projection". Over the course of the pregnancy, and particularly during the postnatal period, the bond is no longer based solely on mental representations but is also influenced by other factors as the mother develops an actual relationship with her child. The change in the characterisation of the bonding relationship from the antenatal to the postnatal stages can be seen in the content of the questions in the two bonding questionnaires utilised for this study.

Another aspect that has been shown to influence changes in the bonding experience is the incidence of demographic, health, obstetric, psychological and social factors. A number of antenatal variables have been noted by various researchers to be related to antenatal and postnatal bonding. However, once again there has not been evidence of relationships between variables consistently over time. For instance, while Condon and Corkindale (1997) reported that low antenatal bonding was linked to high levels of depression (as well as other variables), Honjo et al. (2003) contrasted their study with studies like that of Condon and Corkindale who sampled pregnant women in the third trimester. Honjo et al. found that when the depression and antenatal bonding data were collected earlier in the pregnancy there was no direct association between the two variables, though each of the two variables had in common correlations with other variables. Other researchers (Lindgren, 2001; Mercer & Ferketich, 1990) have suggested that examination of the association between maternal bonding and other variables needed to assess more complex models that included indirect pathways.

However, as already noted, in the current study, none of the proposed relationships were supported, and the small sample size did not allow for complex analysis of data.

What appeared to be of interest though was that while none of the bonding measures appeared to be related with any of the other antenatal data, there were relationships among all the other variables. Even those adolescents who appeared to be dealing with a number of life stressors such as depression, anxiety, and/or low levels of social support during the antenatal period, continued to report relatively high bonding to their foetus or infant. It may be possible to hypothesise that the adolescents in this study may have been operating on two levels; being affected by their day to day life, but functioning separately and somewhat disconnectedly when thinking about their bond with their baby. There have in fact been previous studies (Quinlivan et al., 2004; Smith & Grenyer, 1999) that have spoken about the idealisation of the pregnancy.

These hypotheses were all generated after the data analysis was carried out to try and understand the findings. They are simply presented here as propositions and offer some food for thought for further research. The results of the study did show evidence of other correlations between various variables that had not been the main focus of the research. These are described below.

5.2.4 Associations between Psychological Factors

The post-hoc analyses identified a web of direct interrelationships among many of the variables tested, despite the lack of significant correlations between many antenatal factors and postnatal bonding at six weeks postpartum. These findings are consistent with a number of other studies, as summarised in Table 21.

Table 21
Similarity with Findings from other Studies

Current Results	Prior research findings
Strong associations between anxiety and depression.	Heron et al. (2004): Antenatal anxiety, particularly in late pregnancy was predictive of postnatal depression, even after antenatal depression was controlled for. Ross et al. (2003): High co morbidity of anxiety and depression in childbearing women during both pregnancy and postpartum.
Negative relationships between social support and anxiety / depression.	Brage et al. (2000): Supportive relationships were negatively related to postnatal depression. Logsdon et al. (2002): Inadequate social support was associated with depression. Mercer & Ferketich (1990): Received social support was negatively related with state anxiety. Milan, Ickovics et al. (2004): Supportive relationships were negatively related to emotional distress (including anxiety and depression).
Moderate correlations between postnatal bonding and postnatal anxiety.	Mercer & Ferketich (1990): State anxiety explained 19% of the variance in early maternal infant bonding.
Moderate correlations between postnatal bonding and postnatal depression.	Feldman et al. (1999): Postnatal depression limits a mother's capacity to develop a bonding relationship with the infant. Pope (2000): Postnatal depression impacts on a woman's ability to carry out her maternal role effectively. Webster et al. (1994): Strong correlation between depression scores and maternal adjustment and maternal attitude scores.
Correlation between depression scores at all three time points (antenatal period, six weeks postpartum, and twelve weeks postpartum).	Heron et al. (2004): Moderate stability between antenatal and postnatal depression scores, despite mean decrease in symptoms over time. Pope (2000): A woman who is depressed during pregnancy is more likely to develop postnatal depression.
Correlation between anxiety scores at all three time points	Heron et al. (2004): Anxiety found to be moderately stable between pregnancy and postpartum period.

Though not the objective of this investigation, partly due to sample size restrictions, it could be hypothesised that not only are these variables directly related with each other, but that a number of other moderated and mediated relationships among these as well as other variables would be noted if it had been possible to use a more sophisticated analytic technique such as structural equation modelling. The complex interrelationship between psychological factors has been previously noted by some researchers (Mercer & Ferketich, 1990; Muller, 1996; Slade et al., 1999).

5.2.5 The Influence of Belief Systems

A major area of interest of this study was to gain an understanding of the religious and cultural backgrounds of these young women and the influence related beliefs have on their experience of the pregnancy.

As has been mentioned earlier, due to the exploratory nature of these questions, generalisations to the pregnant adolescent population cannot be made. However, a number of themes emerged from the interviews carried out with the participants, which may guide future research on the topic.

The influence that ethnicity had on the pregnancy experience was elicited best from those women who were born overseas; perhaps because they had the benefit of being immersed in both cultures and so were able to compare values from their country of birth to Australian values in regard to adolescent pregnancy. It appeared that particularly for those

born overseas, cultural values were often enmeshed with religious values. In some cases these women may have had an added challenge of managing tension between Australian mores and the (usually) more traditional or conservative values brought with them and their family from their country of origin. Yet, despite non-Australian cultures reportedly being less ideologically tolerant of adolescent pregnancy and/or pregnancy out of wedlock, participants from non-Australian backgrounds were not alone in experiencing negative reactions to the pregnancy. Initial feelings of shock, surprise, fear, worry and confusion were described by many of the adolescents, irrespective of cultural or religious backgrounds. These emotions eventually tended to give way to more positive ones, as the adolescent became more accepting of the situation and in cases where the pregnant adolescent had found support from her family, partner and/or friends.

More of the women in the sample were able to identify ways in which religion and their own religious beliefs, or those of others, impacted on them during the pregnancy. The Muslim women, who were all married prior to falling pregnant, had been encouraged to try for a baby. For those adolescents who had a Christian denomination, pregnancy out of wedlock was frequently raised as an issue, in line with the Christian church's attitude toward premarital sex (Morgan & Lawton, 1996). However, contrary to the hypothesis put forward by Sorenson et al. (1995) that church attendance among unmarried pregnant adolescents resulted in higher levels of distress, some adolescents in the study continued their religious participation, despite their pregnancy status; even describing it as a source of support rather than a stress.

5.2.6 Heterogeneity of the Sample

Comparative studies of adolescent mothers and non-adolescent mothers have often noted differences between the two groups (Elster et al., 1983; Quinlivan et al., 2004; Stier et al., 1993), with younger mothers appearing to be disadvantaged compared to their older counterparts on a number of demographic, health, obstetric, care-giving, psychological and social factors. However, when sampling occurred across a cross-section of pregnant and nulliparous adolescents from similar backgrounds (Milan, Ickovics et al., 2004), no significant differences were noted between the two groups in regard to the severity of emotional distress, though its prevalence was elevated when compared to adolescent norms.

This example demonstrates how care needs to be taken when interpreting results, due to the influence of sampling differences and different data collection methods. It also indicates that caution needs to be applied in making generalisations about findings.

Based on sample descriptives of the current sample, it could be said that overall the majority of adolescents appeared to be functioning well psychologically and socially, and were bonding well with their infants. Furthermore, many of the antenatal variables measured, did not appear to predict, or even be related with, postnatal bonding at six weeks. However, closer inspection of the data revealed that the group was not homogenous and that there were a number of cases where scores indicated difficulties in one or more areas of psycho-social functioning. While statistically such cases may be considered to be outliers

in a clinical sense these cases may in fact be evidence of an important subgroup of adolescents who may not be functioning as well, compared to the larger cohort.

To illustrate some of the individual variation among this sample of pregnant and parenting adolescents, four case studies are presented in the following section.

5.3 Case Studies

A few cases were selected to provide a more in-depth account of some of the participants. The cases were not selected randomly, but chosen to highlight various circumstances these women found themselves in. The information provided here is based on data collected from the women from the questionnaires and the semi-structured interview. It will be noted that there are gaps and the accounts are not in any way comprehensive, as these women were not followed regularly throughout the pregnancy. Where total scores on the measures are presented, the sample's mean scores are also included to provide a comparison. The names used in these accounts are fictitious.

5.3.1 Case Study 1: Kara

Kara, a Maori woman, was aged 17 years 8 months and was 12 weeks pregnant when she agreed to be part of the study. Kara had moved to Melbourne from New Zealand with her mother five years prior. She had completed Year 11 level of her education.

Kara stated that the pregnancy was an accident, and she initially felt sad and angry upon learning of the pregnancy and had even considered an abortion. This was not Kara's first pregnancy; she had suffered a miscarriage earlier in the year. Kara stated that as the pregnancy went on, she felt more positive about it, but was still worried about financial matters. At the time of recruitment, Kara was living with her mother, but despite reportedly

having a close relationship with her mum, this arrangement was only temporary and Kara said that she was planning to move. During the interview Kara stated that she no longer was with her boyfriend (father of the baby) but that the break-up was unrelated to the pregnancy.

Kara's total scores on the antenatal measures are summarised in Table 22 below. The table also includes the sample means for each measure as a comparison.

Table 22
Comparison of Kara's Scores to Mean of Sample (n=52)

Measures	Kara's total scores	Sample mean total scores	Sample mean std deviation
MAAS: antenatal bonding	59	75.62	8.90
PBI: maternal care	35	26.38	8.03
PBI: maternal control	1	14.38	7.05
HADS-A: antenatal anxiety	8	6.27	3.74
EPDS: antenatal depression	17	8.81	4.85
PSQ: antenatal social support received	7	5.90	1.51

It is immediately noticeable that Kara's scores deviate from the mean on a number of measures – particularly a much lower score on the MAAS and the maternal control scale of the PBI, as well as a depression score, as assessed by the EPDS, that is well above the cut-off score of 14.

Kara gave birth to a baby boy weighing 3360g, at 39 weeks gestation. The birth was reported to be a normal vaginal birth, with a lengthy labour of 25 hours. There were

some initial concerns regarding jaundice for the infant. It was unclear from the birthing information available how long Kara and her son were in hospital for prior to discharge.

There had been no contact with Kara for a period of about 6 months for the purpose of this research. Six weeks postnatally, Kara was contacted by phone to organise a time to carry out the six-week follow-up. A relative provided a new mobile number on which to reach Kara. This number was answered by a male who identified himself as Kara's boyfriend. He stated that Kara had left Melbourne and moved interstate a few days prior and had left the baby in his charge. He was unsure as to whether Kara would return to Melbourne or not. It was agreed with Kara's boyfriend that no further contact would be attempted for research purposes. However he was also able to confirm that his family and the hospital were aware of the circumstances, and that he felt that he was getting the necessary support. Kara's boyfriend was reminded that he could contact the Young Mums' Clinic that Kara had attended at the hospital should he require help, since the clinic had access to medical, maternal and child health care nurses and social work services.

5.3.2 Case Study 2: Stephanie

Stephanie was recruited into the study when she was 12 weeks pregnant and aged 18 years 2 months. This was her first pregnancy, and despite being unplanned she had no thoughts about a termination. Stephanie reported sharing a relatively close relationship with her mother, but this had deteriorated after the news of the pregnancy, and both her parents were not speaking to her at the time of the interview. This lack of communication

was a cause of great distress for Stephanie, and she stated that she found it hard to cope emotionally, and had little female support available. Stephanie's extended family had argued with Stephanie's mother about her reaction, but they lived too far away to offer much support. Stephanie stated that she was still with the father of the baby, and her partner, although shocked at the news had told her that he would support her "*no matter what*". In fact, Stephanie was living with her partner. Despite having the support of her partner and her friends as well as the professional support of a counsellor, Stephanie still reported feeling quite isolated and found it hard coping "*on [her] own*".

Stephanie's level of distress is also reflected in her scores obtained on the antenatal questionnaires, reported in Table 23.

Table 23
Comparison of Stephanie's Antenatal Scores to Mean of Sample (n=52)

Measures	Stephanie's total scores	Sample mean total scores	Sample mean std deviation
MAAS: antenatal bonding	77	75.62	8.90
PBI: maternal care	16	26.38	8.03
PBI: maternal control	34	14.38	7.05
HADS-A: antenatal anxiety	12	6.27	3.74
EPDS: antenatal depression	21	8.81	4.85
PSQ: antenatal social support received	2	5.90	1.51

These scores indicate an average bonding to her foetus when compared to the sample mean score. However Stephanie's responses on the PBI indicate that at the time of completing the questionnaire, her recollection of being mothered was quite negative. Her

scores on the anxiety subscale of the HADS indicate a "moderate" level of anxiety, and the depression scale (EPDS) score is very high compared to the cut-off score of 14, used to indicate the presence of depressive emotions. The social support scale provided further information indicating that Stephanie felt she was not receiving enough support, and the 'anticipated scores' showed that she did not think that her circumstances would change, with more than a hundred point difference between her "Important" and "Expected" scores.

Stephanie was at 38 weeks gestation when she gave birth to a baby boy. The labour was induced, and the total labour time was 4 hours. The baby weighed 3010grams, and the APGAR scores read 9 at both the 1 minute and 5 minute intervals. There was some evidence of birthing trauma. The baby and mother were kept in hospital for four days before being discharged.

Stephanie was contacted six weeks after the birth of her son, and she was agreeable to being visited by the researcher to complete the postnatal follow-ups. At the six-week follow-up Stephanie reported that her boyfriend had just left her the night before, leaving her alone with the baby. She was understandably quite tired and distressed and found it hard to settle her baby. Friends were present in her home when the researcher called. One of these friends who also had a baby was present again at the three month follow-up appointment. This friend helped with soothing the baby and the two women appeared to swap stories and tips about their children. Results and comparisons for the follow-ups are found in Table 24.

Table 24
Comparison of Stephanie's Postnatal Scores to Means of Sample

Measures	Stephanie's total scores – 6 weeks	Sample mean total scores – 6 weeks *(n =52)*	Stephanie's total scores – 12 weeks	Sample mean total scores – 12 weeks *(n =49)*
MPAS: postnatal bonding	79.8	84.31	80.6	85.16
HADS-A: postnatal anxiety	13	5.00	10	4.78
EPDS: postnatal depression	16	7.25	13	6.45

Stephanie's postnatal bonding scores appear to be quite consistent over time, while those of depression and anxiety are slightly lower at the three month follow-up when compared to the six week follow-up and the depression scores are much lower than the original antenatal score obtained (refer to Table 23), indicating a possible improvement in her mood, over time. However, her scores for anxiety and depression are significantly higher than the mean scores for the sample. It is possible to interpret these scores in the context of Stephanie's life situation, and the inadequate social support she reportedly received both during the antenatal and postnatal periods from her family and her partner. However, Stephanie's postnatal bonding scores did not appear to be particularly low in comparison to the elevated depression and anxiety scores.

5.3.3 Case Study 3: Rebecca

Rebecca was an Australian woman aged 18 years 7 months, at a gestation age of 25 weeks when she was recruited into the study. She was still in school, in year 12, when she found out she was pregnant, but had since finished her schooling and begun working part

time. This was her first pregnancy and she reported that it was unplanned. Her initial reaction was one of shock and she felt quite negative about the pregnancy, even considering a termination. Rebecca stated that the news took a while to get used to, not just for her, but also for her parents and her boyfriend of one year, but that all were supportive.

Rebecca stated that the fact that she was unmarried was not so much a problem for her parents, as they were not legally married themselves, but that this was brought up by her boyfriend's parents who were more traditional and religious. Rebecca's dad was also quite shocked at the news, particularly because, according to Rebecca, he had a commitment to a *"sequence of events"* that should occur prior to starting a family. Rebecca stated that her mother was particularly supportive, helping Rebecca to organise things and that she was a great source of advice. Rebecca, who lived with her mother, described having a close relationship with her.

Rebecca found that as a result of the pregnancy she had made a number of lifestyle changes – she no longer went out with friends, smoked or drank, and so her circle of friends changed too, and she did not see as much of them as before. Rebecca's scores for the antenatal questionnaire are reported in Table 25.

Table 25
Comparison of Rebecca's Antenatal Scores to Mean of Sample (n=52)

Measures	Rebecca's total scores	Sample mean total scores	Sample mean std deviation
MAAS: antenatal bonding	83	75.62	8.90
PBI: maternal care	36	26.38	8.03
PBI: maternal control	5	14.38	7.05
HADS-A: antenatal anxiety	0	6.27	3.74
EPDS: antenatal depression	5	8.81	4.85
PSQ: antenatal social support received	7	5.90	1.51

Rebecca's total scores show that Rebecca reported feeling slightly more bonded to her foetus than other women in the sample and experienced above average care and less control from her mother when growing up. She also reported much fewer symptoms of depression and anxiety and a maximum score on the received social support scale.

The birthing information available for Rebecca showed that she had a vaginal birth at 40 weeks gestation, giving birth to a baby girl weighing 3406 grams, with APGAR scores rated 9 at both the 1 minute and 5 minute intervals.

Rebecca was happy to complete the postnatal questionnaires. Rebecca was still living with her mother, and stated that she continued to receive a lot of support from her. It appeared, based on her responses that she may no longer have been going out with her boyfriend, but this was not brought up as a topic. Rebecca described experiencing feelings of happiness and joy over the birth of her daughter. While reading through the items, Rebecca expressed concern and sadness for women who could not bond with their infants, and hoped that they would be able to get help to be able to enjoy their baby. She added that

she found the questionnaires quite helpful as they helped her to reflect on her relationship with her daughter. Total scores on the postnatal questionnaires for Rebecca are reported in Table 26.

Table 26
Comparison of Rebecca's Postnatal Scores to Means of Sample

Measures	Rebecca's total scores – 6 weeks	Sample mean total scores – 6 weeks *(n =52)*	Rebecca's total scores – 12 weeks	Sample mean total scores – 12 weeks *(n =49)*
MPAS: postnatal bonding	87.8	84.31	89.1	85.16
HADS-A: postnatal anxiety	1	5.00	3	4.78
EPDS: postnatal depression	8	7.25	4	6.45

Rebecca's postnatal total scores indicate that her bond to her infant was slightly above the average for the sample. Similar to the antenatal period, Rebecca reported low to average scores on the anxiety and depression scales.

5.3.4 Case Study 4: Melanie

Melanie, a 17 year 11 month old adolescent of Maltese descent agreed to participate in this study when she was 17 weeks pregnant. Melanie had had a previous termination of a pregnancy two years prior. The current pregnancy had not been planned and Melanie felt shocked at the news and scared of what her parents would say. She stated that she had not considered a termination for this pregnancy. When Melanie initially informed her parents

about her condition, she said that they were initially upset as they thought it would ruin her life. However they were also supportive, talking things through with Melanie, and her mother provided advice about pregnancy and having a baby. Melanie, who continued to live at home with her parents, attended her antenatal appointments together with her mother and appeared to have a good relationship with her.

As the pregnancy progressed the close relationship that Melanie had with her mother did not change. Both Melanie and her mother felt more positive about the pregnancy as it appeared to bring about a number of changes for the better. Melanie stated that her life had changed quite significantly – she felt happier and closer to her family than she had felt before, had changed her group of friends and had made plans to return to school, which she had not been interested in completing before the pregnancy. Melanie had also ended her relationship with the father of the baby during the pregnancy, describing the relationship as "bad", that it had affected her in a negative way, and stating that the boyfriend had also been abusive. Melanie believed that she had become more mature and responsible as she accepted that she was going to become a mother. She also felt very confident about this change in status.

Apart from the strong family support, Melanie also received additional social support from her school friends and the teachers. Melanie and her family were Catholic, and although the family had not been attending church recently, Melanie stated that she prayed every day and was thinking about becoming more active by returning to church. The results of the antenatal questionnaires and comparison to the sample means can be found in Table 27.

Table 27
Comparison of Melanie's Antenatal Scores to Mean of Sample (n=52)

Measures	Melanie's total scores	Sample mean total scores	Sample mean std deviation
MAAS: antenatal bonding	81	75.62	8.90
PBI: maternal care	23	26.38	8.03
PBI: maternal control	18	14.38	7.05
HADS-A: antenatal anxiety	12	6.27	3.74
EPDS: antenatal depression	14	8.81	4.85
PSQ: antenatal social support received	7	5.90	1.51

Melanie's scores on the parental bonding scale indicate that she largely falls within the average range for this sample, with only slight variation. It is interesting to note however, that while Melanie verbally reported feeling happier and more positive about the pregnancy, the antenatal scores for depression and anxiety are high compared to the sample means. The anxiety score on the HADS-A indicates the presence of 'moderate anxiety' and the depression score of 14 on the EPDS meets the cut-off point recommended during pregnancy. A closer look at the individual items indicated that while Melanie still appeared to get enjoyment she still felt quite anxious and when she felt sad it impacted on her quite strongly. Nevertheless, Melanie felt she was receiving the maximum amount of support possible

Melanie delivered a baby boy weighing 2604 grams when she was at 36 weeks gestation. The labour lasted for 7.5 hours and required vacuum extraction due to a severe pre-eclampsia condition. Melanie's son suffered respiratory distress and was kept in a

neonatal unit for 8 days. The APGAR scores were recorded as "4" at first minute and then "9" at the fifth minute after birth. Melanie completed the follow-up questionnaires at the six-week and three-month intervals. The scores obtained are recorded in Table 28.

Table 28
Comparison of Melanie's Postnatal Scores to Means of Sample

Measures	Melanie's total scores – 6 weeks	Sample mean total scores – 6 weeks *(n =52)*	Melanie's total scores – 12 weeks	Sample mean total scores – 12 weeks *(n =49)*
MPAS: postnatal bonding	82.8	84.31	84.7	85.16
HADS-A: postnatal anxiety	16	5.00	13	4.78
EPDS: postnatal depression	20	7.25	17	6.45

Melanie's bonding scores to her son were in the average range, and consistent with the antenatal scores. However her anxiety and depression scores had increased during the postnatal period, particularly during the six-week data collection point. These scores were also much higher than the sample mean scores. Based on these results, it appears that the depressive and anxious feelings Melanie experienced had not affected the development of bonding to her infant at this stage. Melanie continued to report in her verbal interactions with the researcher that she was coping and that she had a lot of support from her family. It is difficult to interpret the reason for such high psychopathology scores in this context without the availability of further information.

5.4 Limitations

There were a number of limitations of this study that were likely to influence the findings. Primarily, the size of the sample was small, thereby having an effect on the reliability, and subsequently the generalisability, of the statistical results. It is a possibility that the results of some of the analyses were not found to be significant, or that the distribution may have been affected due to the small sample size.

Generalisation of the results may also have been reduced by the fact that the sample may not be totally representative of the population of primiparous pregnant adolescents in the Western Suburbs of Melbourne. While 72% of those pregnant adolescents approached did agree to participate in the study, some declined to be part of the study, and others withdrew from the study after having signed the consent form, often reporting that they were either too busy or that they had been asked by their partner to revoke consent. There were women who were not eligible for participation because they required an interpreter. If interpreter resources were accessible, the non-English speaking women could have been included and this would have allowed for a richer exploration of the cultural and religious beliefs. Other pregnant adolescents did not attend the hospital for antenatal care, either choosing to access it elsewhere, or not receiving any care until they were in labour. It is not known how the latter subgroup would have responded, though it may be hypothesised that those who do not access support may have had poorer psychological functioning and be in more need of support (Rhodes et al., 1993).

Another possible limitation of this study was its reliance on self-report methods. Self-report measures are considered to be a useful way to collect large amounts of information relatively quickly, and in this study could provide valuable information on the adolescents' perceptions of relationships, bonding experiences and psychological functioning. However, it may also have lead to a number of biases due to the nature of the measures themselves. The questionnaires, despite being standardised and demonstrating strong reliability, may not have adequately encapsulated the concepts they are meant to be measuring. Nevertheless, other studies in the field have also made use of self-report measures and have reported significant findings (Aiello & Lancaster, 2007; Heron et al., 2004; Mercer & Ferketich, 1990).

Recruitment of the sample occurred throughout the pregnancy. While it had been planned to recruit adolescents early in their pregnancy, this was not always possible due to a number of factors. There were occasions when the adolescents did not present at the clinics until a much later stage in their pregnancy. In other cases, the adolescent chose to engage in shared antenatal care (between a private GP and the public hospital clinics where recruitment occurred) so that attendance at the clinic was sporadic. The result was that adolescents were recruited across the three trimesters. So as to minimise the impact of the large gestation range, gestation in weeks was considered as a covariate, and was in fact included in the main analyses as such, given that it was significantly related to antenatal bonding. While no other significant relationships were noted in the statistical analysis, other studies (Honjo et al., 2003) have shown a possibility of changes in relationships between variables across the pregnancy. It may also be hypothesised that due to the volatility of important relationships for adolescent mothers (Barnet et al., 1996; Rhodes et

al., 1994; Richardson & Barbour, 1991), and the resultant influence of social support on factors related to psychological wellbeing (Brage et al., 2000; Logsdon et al., 2002) responses given on the questionnaires may have been somewhat variable as they only provided a snapshot of the respondent's experience at that point in time, thus not capturing the subjective changes that may have occurred across the period of the pregnancy.

The data may also have been biased as self-report methods are influenced by factors such as psychological state, recollection of memories in regard to retrospective measures, and social desirability. The latter may have been particularly contentious in regard to the measurement of postnatal bonding, with a possible likelihood for these young women to under-report negative bonding experiences or mother-infant relationship difficulties for fear of negative consequences, such as involvement from child protection services. In fact, as already noted, the range for postnatal bonding for the current sample was more restricted than that reported in other studies.

5.5 Contributions

This longitudinal study examined the relatively neglected area of maternal infant bonding among primiparous adolescents. It sampled adolescents from the Western suburbs of Melbourne, Australia and was able to measure the relationships between a number of psychological variables across pregnancy through until the early postnatal period – antenatal bonding, maternal care, maternal control, antenatal and postnatal depression, antenatal and postnatal anxiety, social support received in the antenatal period and postnatal bonding.

This thesis has shown the complexity of interrelationships occurring among many of the psychosocial factors tested, as well as the relative stability of factors such as depression and anxiety across the antenatal and postnatal period. The thesis has also suggested some possible explanations for some of the findings, which may be useful considerations for future research. It appears to be the first study of its kind to explore the influence of cultural backgrounds and religious belief systems on the experiences of pregnant adolescents in Melbourne. Finally, by providing case studies, the research has highlighted the importance of taking into account the variability that occurs within this sample as clinical cases may otherwise be overlooked.

5.6 Recommendations

One possible reason for the limited amount of research in this area may be due to the difficulty in recruiting participants from the pregnant adolescent population. However, as Kaiser and Hays (2006) point out recruitment difficulties do not provide justification to abandon such study. On the contrary, particularly due to the fact that studies have shown adolescent pregnancy and motherhood are more likely to be associated with negative outcomes for both the mother and her child, research needs to be carried out so as to determine which factors are predictive of increased well-being for these young women and their offspring.

Contrary to some findings by other researchers, analysis of the data for the current research did not find evidence of significant relationships between many of the antenatal variables (such as depression, anxiety and social support) and postnatal bonding at six weeks. It is not known whether the non-significance of the results is valid, or whether it is due to a number of limitations (listed in Section 5.2.2, p. 132) of the current study. Much of the work available on the area of postnatal bonding has been carried out with adults. It is possible that adolescent mothers form a subgroup with special features and circumstances. This issue could be addressed if further testing of predictors of postnatal bonding were carried out, preferably using a larger sample size. The use of structural equation modelling would allow for the testing of both direct and indirect relationships through the use of path analysis. While social support at a general level was considered in this study, future research may wish to specifically focus on the antenatal buffering effect of partner support

with this population. The inclusion of other psychological variables may also need to be considered. One such variable is that of parental competence, which has been reported in the literature (Mercer & Ferketich, 1990; Webster et al., 1994) as having a significant relationship with postnatal bonding. In the current study, competence was also noted by some adolescents during the interview as influencing a change towards more positive emotions during the pregnancy, and differences in confidence about impending motherhood influenced antenatal bonding scores. It may also be useful to consider the buffering effect of social support provided by the mother of the adolescent and the partner of the adolescent on factors such as depression and anxiety.

Clinically, the heterogeneity of the pregnant / parenting adolescent sample in this study highlights the need for those involved in obstetric care to collect information relating to the psychosocial history of these women, so as to identify those women who may require further assessment or intervention.

5.7 Concluding Statement

This thesis sought to examine the influence of antenatal factors on maternal bonding for adolescent mothers. In doing so, it contributed to an area of study that has been largely neglected in Australia, with only limited empirical data currently available on the predictors and effects of maternal bonding among adolescent mothers. Furthermore it entered new areas by exploring the influence of cultural and religious beliefs on these adolescents.

As experienced by other investigators who have previously studied pregnant and parenting adolescents, a number of challenges were encountered in conducting longitudinal research with this population. However, continuing research in the area is important as there are pregnant and parenting adolescent who are experiencing difficulty. While overall, the adolescent pregnancy rate may be decreasing and many young mothers manage very well, for those at risk of developing poor maternal bonding there are implications for well-being of both mother and child. An understanding of the factors influencing maternal bonding can contribute to the development of appropriate assessments, interventions and services to support these young women and their children.

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Appendices

Appendix A

Background Questionnaire

Date: _____

Date of birth: _____

Gestation date: _____

For each Question, please circle one of the options

1) **Highest education level reached**
   a) Finished Primary School
   b) Secondary school – Year 7 / Year 8 / Year 9 / Year 10 / Year 11 / Year 12
   c) Tertiary Education

2) **Current employment:**
   a) Unemployed
   b) Part-time employment for _____ hours per week as _____
   c) Full-time employment as _____
   d) Student – secondary/tertiary

3) **In which country were you born?**
   a) Australia
   b) Other (Please specify) _____

4) **What is your ethnic background?**
   a) Australian
   b) Vietnamese
   c) Maltese
   d) Italian
   e) Macedonian
   f) Filipino
   g) Other (please specify) _____

5) **Is this your first pregnancy?**
   a) Yes
   b) No

6) **Have you had any previous miscarriages?**
   a) Yes
   b) No

7) **Have you had any previous terminations?**
   a) Yes
   b) No

8) Was this pregnancy planned?

a) Yes, definitely planned
b) No, not actively planned
c) No, definitely an accident

9) How did you feel on learning of this pregnancy?

a) Totally positive
b) Generally positive but some negative feelings
c) Totally negative

10) Did you consider termination of the pregnancy?

a) Yes
b) No

11) How do you feel about becoming a mother?

a) Very confident
b) Confident
c) Neither Confident or unconfident
d) Unconfident
e) Very unconfident

12) Who are you currently living with?

a) Mother / Father / Both parents (Please circle)
b) Partner
c) Partner and partner's family
d) Alone
e) Other _____ (Please specify)

13) How long have you had these living arrangements?

a) Less than 6 months
b) Less than 1 year
c) 1 – 2 years
d) More than 2 years

14) Is your current partner the father of your baby?

a) No partner
b) Yes
c) No

15) How would you describe your current relationship with your mother?

a) Mother not alive
b) Close relationship
c) Fair relationship, reasonably warm
d) Poor relationship, not particularly warm
e) Very poor relationship, cold or hostile
f) No contact

Appendix B

Maternal Antenatal Attachment Scale (MAAS)

(Condon, 1993)

Please select the response which is closest to your own feelings.

1. **Over the past two weeks I have thought about, or been preoccupied with the baby inside me:**

[ ] almost all the time
[ ] very frequently
[ ] frequently
[ ] occasionally
[ ] not at all

2. **Over the past two weeks when I have spoken about, or thought about the baby inside me I got emotional feelings which were:**

[ ] very weak or non-existent
[ ] fairly weak
[ ] in between weak and strong
[ ] fairly strong
[ ] very strong

3. **Over the past two weeks my feelings about the baby inside me have been:**

[ ] very positive
[ ] mainly positive
[ ] mixed positive and negative
[ ] mainly negative
[ ] very negative

4. **Over the past two weeks I have had the desire to read about or get information about the developing baby. The desire is:**

[ ] very weak or non-existent
[ ] fairly weak
[ ] in between weak and strong
[ ] fairly strong
[ ] very strong

5. **Over the past two weeks I have been trying to picture in my head what the developing baby actually looks like in my womb:**

[ ] almost all the time
[ ] very frequently
[ ] frequently
[ ] occasionally
[ ] not at all

6. Over the past two weeks I think about the developing baby mostly as:

[ ] a real little person inside me with special characteristics
[ ] a baby like any other baby
[ ] a human being
[ ] a living thing
[ ] a thing not yet really alive

7. Over the past two weeks I have felt the baby inside me is dependent on me for its well-being:

[ ] totally
[ ] a great deal
[ ] moderately
[ ] slightly
[ ] not at all

8. Over the past two weeks I have found myself talking to my baby when I am alone:

[ ] not at all
[ ] occasionally
[ ] frequently
[ ] very frequently
[ ] almost all the time I am alone

9. Over the past two weeks when I think about (or talk to) my baby inside me, my thoughts:

[ ] are always tender and loving
[ ] are mostly tender and loving
[ ] are a mixture of both tenderness and irritation
[ ] contain a fair bit of irritation
[ ] contain a lot of irritation

10. The picture in my mind of what the baby at this stage actually looks like inside the womb is:

[ ] very clear
[ ] fairly clear
[ ] fairly vague
[ ] very vague
[ ] I have no idea at all

11. Over the past two weeks when I think about the baby inside me I get feelings which are:

[ ] very sad
[ ] moderately sad
[ ] a mixture of happiness and sadness
[ ] moderately happy
[ ] very happy

12. Some pregnant women sometimes get so irritated by the baby inside them that they feel like they want to hurt it or punish it:

[ ] I couldn't imagine I would ever feel like this
[ ] I could imagine I might sometimes feel like this, but I never actually have
[ ] I have felt like this once or twice myself
[ ] I have occasionally felt like this myself
[ ] I have often felt like this myself

13. Over the past two weeks I have felt:

[ ] very emotionally distant from my baby
[ ] moderately emotionally distant from my baby
[ ] not particularly close to my baby
[ ] moderately close emotionally to my baby
[ ] very close emotionally to my baby

14. Over the past two weeks I have taken care with what I eat to make sure the baby gets a good diet:

[ ] not at all
[ ] once or twice when I ate
[ ] occasionally when I ate
[ ] quite often when I ate
[ ] every time I ate anything

15. When I first see my baby after the birth I expect I will feel:

[ ] intense affection
[ ] mostly affection
[ ] dislike about one or two aspects of the baby
[ ] dislike about quite a few aspects of the baby
[ ] mostly dislike

16. When my baby is born I would like to hold the baby:

[ ] immediately
[ ] after it has been wrapped in a blanket
[ ] after it has been washed
[ ] after I have had a rest for an hour or so
[ ] the next day

17. Over the past two weeks I have had dreams about the pregnancy or baby:

[ ] not at all
[ ] occasionally
[ ] frequently
[ ] very frequently
[ ] almost every night

18. Over the past two weeks I have found myself feeling or rubbing with my hand, the outside of the stomach where the baby is:

[ ] a lot of times each day
[ ] at least once per day
[ ] occasionally
[ ] once only
[ ] not at all

19. If the pregnancy was lost at this time (due to miscarriage or other accidental event) without any pain or injury to myself, I expect I would feel:

[ ] very pleased
[ ] moderately pleased
[ ] neutral (ie: neither sad nor pleased; or mixed feelings)
[ ] moderately sad
[ ] very sad

Appendix C

Parental Bonding Instrument (PBI)

(Parker, Tupling & Brown, 1979)

This questionnaire lists various attitudes and behaviours of parents. As you remember your MOTHER in your first 16 years would you place a tick in the most appropriate box next to each question.

	Very like	Moderately like	Moderately unlike	Very unlike
1. Spoke to me in a warm and friendly voice	☐	☐	☐	☐
2. Did not help me as much as I needed	☐	☐	☐	☐
3. Let me do those things I liked doing	☐	☐	☐	☐
4. Seemed emotionally cold to me	☐	☐	☐	☐
5. Appeared to understand my problems and worries	☐	☐	☐	☐
6. Was affectionate to me	☐	☐	☐	☐
7. Liked me to make my own decisions	☐	☐	☐	☐
8. Did not want me to grow up	☐	☐	☐	☐
9. Tried to control everything I did	☐	☐	☐	☐
10. Invaded my privacy	☐	☐	☐	☐
11. Enjoyed talking things over with me	☐	☐	☐	☐
12. Frequently smiled at me	☐	☐	☐	☐
13. Tended to baby me	☐	☐	☐	☐
14. Did not seem to understand what I needed or wanted	☐	☐	☐	☐
15. Let me decide things for myself	☐	☐	☐	☐
16. Made me feel I wasn't wanted	☐	☐	☐	☐
17. Could make me feel better when I was upset	☐	☐	☐	☐
18. Did not talk with me very much	☐	☐	☐	☐
19. Tried to make me feel dependent on her	☐	☐	☐	☐
20. Felt I could not look after myself unless she was around	☐	☐	☐	☐
21. Gave me as much freedom as I wanted	☐	☐	☐	☐
22. Let me go out as often as I wanted	☐	☐	☐	☐
23. Was overprotective of me	☐	☐	☐	☐
24. Did not praise me	☐	☐	☐	☐
25. Let me dress in any way I pleased	☐	☐	☐	☐

Appendix D

Edinburgh Postnatal Depression Scale (EPDS)

(Cox, Holden & Sagovsky, 1987)

Please read each item and circle the answer that comes closest to how you have felt overall during the past seven days, not just how you feel today.

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	0
Not quite so much now	1
Definitely not so much now	2
Not at all	3

2. I have looked forward with enjoyment to things:

As much as I ever did	0
Rather less than I used to	1
Definitely less than I used to	2
No, never	3

3. I have blamed myself unnecessarily when things went wrong:

Yes, most of the time	3
Yes, some of the time	2
No, not very often	1
No, never	0

4. I have been anxious or worried for no good reason:

No, not at all	0
Hardly ever	1
Yes, sometimes	2
Yes, very often	3

5. I have felt scared or panicky for no very good reason:

Yes, quite a lot	3
Yes, sometimes	2
No, not much	1
No, not at all	0

6. Things have been getting on top of me:

Yes, most of the time I haven't been able to cope at all	3
Yes, sometimes I haven't been coping as well as I used to	2
No, most of the time I have coped quite well	1
No, I have been coping as well as ever	0

7. I have been so unhappy that I have had difficulty sleeping:

Yes, most of the time	3
Yes, sometimes	2
Not very often	1
No, not at all	0

8. I have felt sad or miserable:

Yes, most of the time	3
Yes, quite often	2
Not very often	1
No, not at all	0

9. I have been so unhappy that I have been crying:

Yes, most of the time	3
Yes, quite often	2
Only occasionally	1
No, never	0

10. The thought of harming myself has occurred to me:

Yes, quite often	3
Sometimes	2
Hardly ever	1
Never	0

Appendix E

Hospital Anxiety and Depression Scale (HADS)

(Zigmond & Snaith, 1983)

Please read each item and circle the reply which comes closest to how you have been feeling in the past week.
Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought-out response.

1. I feel tense or "wound up:
a) most of the time
b) a lot of the time
c) time to time, occasionally
d) not at all

2. I still enjoy the things I used to enjoy:
a) definitely as much
b) not quite as much
c) only a little
d) hardly at all

3. I get a sort of frightened feeling as if something awful is about to happen:
a) very definitely and quite badly
b) yes, but not too badly
c) a little, but it doesn't worry me
d) not at all

4. I can laugh and see the funny side of things:
a) as much as I always could
b) not quite so much now
c) definitely not so much now
d) not at all

5. Worrying thoughts go through my mind:
a) a great deal of the time
b) a lot of the time
c) from time to time but not too often
d) only occasionally

6. I feel cheerful:
a) not at all
b) not often
c) sometimes
d) most of the time

7. I can sit at ease and feel relaxed:
a) definitely
b) usually
c) not often
d) not at all

8. I feel as if I am slowed down:
a) nearly all the time
b) very often
c) sometimes
d) not at all

9. I get a sort of frightened feeling like "butterflies" in my stomach:
a) not at all
b) occasionally
c) quite often
d) very often

10. I have lost interest in my appearance:
a) definitely
b) I don't take as much care as I should
c) I may not take quite as much care
d) I take just as much care as ever

11. I feel restless as if I have to be on the move:
a) very much indeed
b) quite a lot
c) not very much
d) not at all

12. I look forward with enjoyment to things:
a) as much as I ever did
b) rather less than I used to
c) definitely less than I used to
d) hardly at all

13. I get sudden feelings of panic:
a) very often indeed
b) quite often
c) not very often
d) not at all

14. I can enjoy a good book or radio or TV programme:
a) often
b) sometimes
c) not often
d) very seldom

Appendix F

Postpartum Support Questionnaire (PSQ)

worded for use during antenatal period

(Logsdon & McBride, 1989)

This questionnaire will ask about how supported you currently feel and how much support you expect after the baby is born.

1. How much support do you currently receive? Please circle.

No Support					**A lot of Support**	
1	2	3	4	5	6	7

2. Who is the person who provides most of that support? Please circle.

a. Mother
b. Father
c. Brother or sister
d. Grandparent
e. Other relative
f. Partner, father of baby
g. Partner, not father of baby
h. Friend

3. How satisfied are you with the amount of support you are currently receiving?

Not Satisfied					**Very Satisfied**	
1	2	3	4	5	6	7

The following questions ask ways in which you believe you will need help after your baby is born. For each statement circle how <u>IMPORTANT</u> this type of help is to you, and <u>HOW MUCH</u> help you believe you may receive on the number scales provided. Then circle who you think is most likely to provide this help.

	<u>HOW IMPORTANT</u> **Not important 0 … Very important 7**	**<u>HELP EXPECTED</u>** **No help 0 … Lot of help 7**
1. Need help with cooking meals. **Circle who is most likely to provide this help**.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7
Mother / Partner (Father of Baby) / Partner / Friend / Other Family Members / No-one		
2. Need to be reassured that I am more than just someone's mother.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7
Mother / Partner (Father of Baby) / Partner / Friend / Other Family Members / No-one		
3. Need to have information on taking care of my own body as it heals following the birth of my baby.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7
Mother / Partner (Father of Baby) / Partner / Friend / Other Family Members / No-one		
4. Need to talk to another new mother about my baby's behaviour.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7
Mother / Partner (Father of Baby) / Partner / Friend / Other Family Members / No-one		

	HOW IMPORTANT Not important 0 … Very important 7	HELP EXPECTED No help 0 … Lot of help 7
5. Need help with the washing.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Circle who is most likely to provide this help.

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

6. Need to have information on which skin rashes are normal for the baby to have.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

7. Need to know if my baby's sleeping patterns are normal.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

8. Need help in taking care of my baby so that I can take a shower, eat, or have some time to myself.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

9. Need to have some time for friends and activities (exercise, sport, clubs, parties) I used to enjoy.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

10. Need others to act as if I am special.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

11. Need help in cleaning the house/ apartment.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

12. Need others to appreciate my care of the baby.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

	HOW IMPORTANT	HELP EXPECTED
	Not important 0 — Very important 7	**No help 0 — Lot of help 7**
13. Need to have others act as if my ideas, decisions, and ways of doing things are right or acceptable.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Circle who is most likely to provide this help.

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

14. Need to have information on what my baby's bowel movements should look like.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

15. Need others to act like it is okay for me to need help.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

16. Need to talk with another new mother about how to care for the baby	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

17. Need to have information on resuming sex and/or birth control.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

18. Need to talk with another new mother about how I will adjust to the role of mother.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

19. Need help in obtaining more sleep for me.	0 1 2 3 4 5 6 7	0 1 2 3 4 5 6 7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

	HOW IMPORTANT								HELP EXPECTED							
	Not important							**Very important**	**No help**							**Lot of help**
	0							**7**	**0**							**7**
20. Need someone to talk with me and listen to me about what is interesting and important to me.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Circle who is most likely to provide this help.

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

21. Need to have information on breastfeeding.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

22. Need help in going to the supermarket or chemist.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

23. Need someone to watch my baby so that I can have time alone with my partner/spouse.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

24. Need to have information on my baby's crying (why the baby cries and how to comfort him/her).	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

25. Need others to take my worries and concerns seriously.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

26. Need to have information on handling stress and/or discomfort.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

27. Need others to reassure me that I am not alone in being responsible for my baby.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

	HOW IMPORTANT								HELP EXPECTED							
	Not important							Very important	No help							Lot of help
	0							7	0							7
28. Need to have information on how to care for my baby's umbilical cord (navel, belly button).	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Circle who is most likely to provide this help.

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

29. Need to talk with another new mother about the best places to get baby care supplies, clothing, etc. that I need	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

30. Need money for baby equipment, supplies or bills that go along with having my baby.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

31. Need to have information on my baby's hiccups (why the baby hiccups and what to do).	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

32. Need to talk with another new mother about my labour and delivery experience.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

33. Need others to touch, kiss and hug me.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

34. Need to have others treat me like I am responsible and competent.	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Mother Partner Partner (Father of Baby) Friend Other Family Members No-one

Appendix G

Maternal Postnatal Attachment Scale (MPAS)

(Condon & Corkindale, 1998)

These statements concern the different sorts of emotional reactions parents have when caring for young babies. Please select the response which is closest to your own feelings.

1. When I am caring for the 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 the feeling that the child is deliberately being difficult or trying to upset me:
[ ] very frequently
[ ] frequently
[ ] occasionally
[ ] very rarely
[ ] never

3. Over the last two weeks I would describe my feelings for the baby as:
[ ] dislike
[ ] no strong feelings towards the baby
[ ] slight affection
[ ] moderate affection
[ ] intense affection

4. I can understand what my baby needs or wants:
[ ] almost always
[ ] usually
[ ] sometimes
[ ] rarely
[ ] almost never

5. Regarding my overall level of interaction with the 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

6. When I am with the baby I feel bored:

[ ] very frequently
[ ] frequently
[ ] occasionally
[ ] very rarely
[ ] never

7. When I am with the baby and other people are present I feel proud of the baby:
[ ] very frequently
[ ] frequently
[ ] occasionally
[ ] very rarely
[ ] never

8. I try to involve myself as much as possible in child care and looking after the baby:
[ ] this is true
[ ] this is untrue

9. I find myself talking to people (other than my partner) about the baby:
[ ] many times each day
[ ] a few times each day
[ ] once or twice a day
[ ] rarely on any one day

10. 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 usually feel rather relieved

11. 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 rarely get a lot of enjoyment/satisfaction

12. 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

13. 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

14. 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

15. Over the past two weeks I have found myself just sitting looking at the sleeping baby for periods of five minutes or more:

[ ] very frequently
[ ] frequently
[ ] a few times
[ ] not at all

16. I now think of the baby as:

[ ] very much my own baby
[ ] a bit like my own baby
[ ] not yet really my own baby

17. Regarding the things that I/we have had to give up because of this 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

18. Over the past two weeks, I have felt that I do not have enough time for myself to pursue my own interests:

[ ] almost all the time
[ ] frequently
[ ] a few times
[ ] not at all

19. 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 H

Semi-Structured Interview Guide

- I wonder if you can tell me where your parents came from?
- Were you born here?
- Do your parents talk much about where they came from?
- How important is it for you that your parents came from _____?
- Do you think there's a difference between how you think and how your parents think?
- What sort of things do you do to be involved in that community?

- Do you or your family belong to any particular religion?
- How important is religion to your parents?
- How important is religion to you? Do you go to 'church' often?

- How did you feel when you found out you were pregnant?
- Was your partner as pleased?
- What about your parents?
- Some families are worried when their daughter gets pregnant at an early age. How was it in your family?
- Has your mother given you any advice about being pregnant?
- What changes have you made since being pregnant?

- I don't know much about _____ culture/religion. Could you tell me what it's like in that culture/religion when a woman gets pregnant at an early age?
- Have people had a reaction to your pregnancy?

Appendix I

Participant Information Sheet

VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

PO BOX 14428 MELBOURNE
VICTORIA 8001 AUSTRALIA
PHONE +61 3 9919 4000
FAX +61 3 9689 4069
www.vu.edu.au

THE ROYAL WOMEN'S HOSPITAL

The Royal Women's Hospital
132 Grattan Street, Carlton, Victoria, 3053, Australia

Participant Information

Version 5 Dated 27/04/06

Sites: Sunshine Hospital, Western Health
Young Mothers' Clinic, Royal Women's Hospital

Full Project Title:

Factors Influencing Young Mother's Relationship with their Baby

Principal Researcher: Professor Sandra Lancaster

Student Researcher: Simone Elise Cremona

Associate Researchers: Professor Julie Quinlivan, Angela Steele

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This Participant Information Form is 4 pages long. Please make sure you have all the pages.

1. Your Consent

You are invited to take part in this research project.

This Participant Information contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this Participant Information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project.

You will be given a copy of the Participant Information and Consent Form to keep as a record.

2. Purpose and Background

The purpose of this project is to look at factors in pregnancy that influence young mother's relationship with their baby. Some of these factors could be the young woman's experience of the pregnancy, the support she receives from others and whether she is feeling anxious or depressed. The religious and cultural beliefs held by the young woman and her family may also be important.

A total of 70 people will participate in this project.

The project is being conducted by Professor Sandra Lancaster, from the School of Psychology at Victoria University; Simone Cremona, (Doctor of Psychology Student); and Professor Julie Quinlivan (Senior Consultant in Adolescent Obstetrics & Gynaecology, Sunshine Hospital), Angela Steele (Manager, Young Women's Health Program, RWH). The results of this research will be used to help Simone Cremona to obtain a degree.

3. Procedures

Young women aged between 13 and 19 years who attend the antenatal clinic at Sunshine Hospital and the Royal Women's Hospital will be invited to be part of the study. If you agree to be part of this study we will ask you to fill in some questionnaires and to take part in an interview at the clinic. The total time would be about 45 minutes. We would also like to get some information after the birth of your baby (when the baby is 6 weeks and 3 months old) and so we will need your contact details (and in case you move, the names of family members and/or friends who can help us contact you). We will arrange a time that is convenient to you to come to your home to collect this information (this would take about 15-20 minutes).

4. Possible Benefits

The benefit of this study is that it will help us better understand the difficulties some young mothers have during pregnancy and after the birth of their baby. In the future this knowledge can then be used to develop services aimed at helping the young mother and her child.

5. Possible Risks

There are no known risks associated with this project. However when we are collecting information if for any reason, you felt distressed, or wanted some professional help the researcher would provide you with some contact numbers where you could obtain this help.

6. Privacy, Confidentiality and Disclosure of Information

In any publication, information will be provided in such a way that you cannot be identified. Your name and contact details will be kept confidential and known only to the researchers. This information will be kept separately from the information you provide through the questionnaires and the interview, and will be kept securely on university premises for a period of 7 years. Any information we collect about an individual will be

confidential except if a young woman informs us that she or her baby is at risk. It is the policy of the hospital that in the event that this does occur, we must inform the consultant at Sunshine Hospital or the Royal Women's Hospital so that help can be arranged.

As part of the study, some medical information about your pregnancy and the birth of the baby will be obtained from the clinic. This information will only be used for the purpose of the study and will also be kept confidential.

7. Results of Project

The information from all the young women in the study will be put together and our results will relate to the group of young women but not to any particular person. If you would like to know what we learn through this study we will send you a summary of the results once the study has been completed.

8. Further Information or Any Problems

If you require further information or if you have any problems concerning this project, you can contact Professor Sandra Lancaster on 9919 2397.

9. Other Issues

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

Name: **Dr Stacey Gabriel**
Position: **Secretary for Melbourne Health Human Research Ethics Committee**
Telephone: **9342 7098**

Or

Name: **RWH Consumer Advocate**
Telephone: **9344 2351**

Or

Secretary, University Human Research Ethics Committee, Victoria University,
PO Box 14428 MCMC, Melbourne, 8001
Telephone: **9688 4710**

You will need to inform the secretary of the name of one of the researchers given in section 8 above.

10. Participation is Voluntary

Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. You will be given a 'Revocation of Consent Form' together with a copy of this Participant Information. Should you wish to withdraw from the study, simply fill out this form and send it to:

Professor Sandra Lancaster
School of Psychology
Victoria University
PO Box 14428
Melbourne, VIC, 8001

Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your routine treatment, your relationship with those treating you or your relationship with Sunshine Hospital, Western Health or the Royal Women's Hospital.

Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the Consent Form only after you have had a chance to ask your questions and have received satisfactory answers.

11. Ethical Guidelines

This project will be carried out according to the *National Statement on Ethical Conduct in Research Involving Humans* (June 1999) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethical aspects of this research project have been approved by:

The Human Research Ethics Committee of Melbourne Health

The Human Research Ethics Committee of the Royal Women's Hospital and

The Victoria University Human Research Ethics Committee, Victoria University.

Appendix J

Consent Form

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Consent Form

Version 5 Dated 27/04/06

Sites: Royal Women's Hospital, Sunshine Hospital, Western Health

Full Project Title: Factors Influencing Young Mother's Relationship with their Baby

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I have read, and I understand the Participant Information version 5 dated 27/04/06

I freely agree to participate in this project according to the conditions in the Participant Information.

I will be given a copy of the Participant Information and Consent Form to keep

The researchers have agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

I consent to the researcher accessing my medical records ☐

I consent to being contacted at 6 weeks & 3 months after the birth of my baby ☐

Parental/guardian consent required? Yes☐ No☐

Parent/Guardian available Yes☐ No☐ [completed by researcher], if Yes/Yes

I consent to researcher seeking parental/guardian consent Yes☐ No☐

Participant's Name (printed) .....

Signature Date

Name of Witness to Participant's Signature (printed) .....

Signature Date

Researcher's Name (printed) .....

Signature Date

Note: All parties signing the Consent Form must date their own signature.

Appendix K

Third Party Consent Form

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Third Party Consent Form

Version 5 Dated 27/04/06

Sites: Royal Women's Hospital, Sunshine Hospital, Western Health

Full Project Title: Factors Influencing Young Mother's Relationship with their Baby

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I have read, and I understand the Participant Information version 5 dated 27/04/06.

I give my permission for _____ to participate in this project according to the conditions in the Participant Information.

I will be given a copy of Participant Information and Consent Form to keep.

The researchers have agreed not to reveal the participant's identity and personal details if information about this project is published or presented in any public form.

I consent to the researcher accessing my daughter's medical records ☐

I consent to my daughter being contacted at 6 weeks & 3 months after the birth of her baby ☐

Participant's Name (printed) .....
Name of Person giving Consent (printed) .....
Relationship to Participant: .....

Signature Date

Name of Witness to Parent/Guardian Signature (printed) .....

Signature Date

Researcher's Name (printed) .....

Signature Date

Note: All parties signing the Consent Form must date their own signature.

Appendix L

Revocation of Consent Form

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The Royal Women's Hospital
132 Grattan Street, Carlton, Victoria, 3053, Australia

Revocation of Consent Form

Full Project Title: Factors Influencing Young Mother's Relationship with their Baby

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise any treatment or my relationships with treatment providers at Sunshine Hospital, Western Health or the Royal Women's Hospital.

Participant's Name (printed) .....

Signature Date

Name of Person giving Consent (printed) .....

Relationship to Participant: .....

Signature Date

Please send this form to:

Professor Sandra Lancaster
School of Psychology
Victoria University
PO Box 14428
Melbourne, VIC, 8001