

Young Motherhood, Maternal
Psychopathology and Children's
Cognitive, Behavioural and Emotional
Development

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Dedication

This thesis is dedicated to the families who participated in the South London Child Development Study (SLCDS) and the Cardiff Child Development Study (CCDS). This work would not have been possible if they had not given so generously of their time.

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Summary

The corpus of research contained in this thesis is concerned with the psychological correlates and consequences of an early transition to parenthood for mothers and children. In light of the recent demographic shifts in the postponement of marriage and parenthood, particular attention was given to women who entered motherhood in their early twenties, as well as to teenage mothers. Using data from two prospective longitudinal cohorts in the United Kingdom, three interlocking studies were conducted to chart the course of mental health problems in young mothers and the risks for mental health problems and cognitive deficits in their children. Study 1 found that women who entered parenthood in their teenage and early twenties years are at an increased risk of experiencing a depressive episode during pregnancy and, in the 11 year period that followed their child's birth, most went on to experience subsequent episodes. Study 2 demonstrated that the increased prevalence of antenatal depression among the women who became mothers at young ages, along with the sub-optimal antenatal and postnatal environments they provided, partly accounted for the elevated rates of emotional disorder and cognitive deficits in their offspring. Study 3 replicated the finding of high rates of antenatal depression in a new sample of young mothers and identified four core predictors of their psychopathology: housing dissatisfaction, serious relationship difficulties, a personal history of affective disorder and a family history of psychiatric illness. Across both samples, high rates of antenatal substance use by both groups of young mothers were also observed. These findings call for intervention programmes for adolescent mothers to focus on the antenatal as well the postnatal period, and the expansion of such initiatives to address the needs of early twenties mothers and their offspring.

Chapter 1

GENERAL INTRODUCTION

1.1. *The Focus of the Thesis*

Across the industrialised nations, the age at which a woman enters parenthood is high on the political and public health agenda (Grant et al, 2004; UNICEF, 2001). At the lower end of the age at first birth continuum, teenage parenthood has been identified as a social and public health problem that needs addressing (Robson & Berthoud, 2003; Social Exclusion Unit, 1999). Countries that actively intervene to reduce teenage pregnancy rates make reference to the implications adolescent parenthood has for the state (e.g. welfare dependency) and for the individual (Bonell, 2004; Coley & Chase-Lansdale, 1998). At the higher end of the age at first birth continuum, the recent trend toward later first births, and the increasing rate of pregnancies in women older than 35 have also attracted attention (Bewley, Davies & Braude, 2005; Grant et al, 2006; Hohn, 1990).

Delayed parenthood not only translates to fertility complications and smaller families (Bewley et al, 2005; Rochebrochard & Thonneau, 2002), but it has broader economic consequences as well (Grant et al, 2006). However, while delayed parenthood is of interest, the aim of this thesis is to examine the correlates and consequences of early parenthood. In addition, in light of the recent trends toward delayed marriage and first birth, this thesis takes a broader stance on early parenthood, considering the experiences of women who enter motherhood in their early twenties, as well as those of teenage mothers. Furthermore, as well as considering the experiences of young mothers, this thesis examines the consequences

early parenthood has for children's cognitive, behavioural and emotional functioning. To summarise, the corpus of research contained in this thesis is concerned with the psychological aspects of early parenthood for mothers and children.

1.2. Demographic Trends in Teenage Birth Rates and Women's Age at First Birth and First Marriage

The United Kingdom (UK) witnessed an increase in the number of births to teenage girls in the post-war era. Starting at 22 births per 1000 teenage women in the latter half of the 1950s, the rates continued to rise during the 1960s, peaking at 51 births per 1000 teenage women in 1971 (Kiernan, 1997; Manlove, 1997). After the peak, teenage birth rates declined throughout the 1970s, oscillating between 28 and 33 births per 1000 teenage women throughout the 1980s and into the 1990s. However, although teenage birth rates in the UK have decreased since the 1970s, the decline is by no means as pronounced as that of other developed countries (Kiernan, 1997). In comparison to Western Europe, the UK has the highest rate of teen childbearing: twice that of Germany, three times that of France, and six times that of the Netherlands (Social Exclusion Unit, 1999). In fact, the percentage of births to teenage women in the UK is the second highest in the developed world, with 32 mothers per 1000 teenagers, a rate only lower than that of the USA (UNICEF, 2001).

Alongside the rise in teenage birth rates during the 1950s and 1960s, couples were entering into marriage and parenthood at increasingly younger ages (Kiernan, 1997). However, since the 1970s, both of these patterns have been reversed: both the average age of marriage and first birth in the UK and abroad have increased substantially (Bosch, 1998; Martin et al, 2005; Ventura et al, 2001). In the UK, the average maternal age at first birth in 1971 was 23.7, compared to the present figure of

27.6 years (Office of National Statistics, 2006, Table 1.6). Correspondingly, birth rates for women aged 30 and over have increased extensively, while those for women in their twenties have declined (Office of National Statistics, 2007). Throughout the 1980s and 1990s the greatest number of women entering parenthood in any age group occurred for mothers aged 25 to 29. However, over the last decade, the age range with the greatest number of births has risen; for the first time, birth rates for women aged 30 to 34 now exceed those for women aged 25 to 29 (Office of National Statistics, 2007). Across Europe, this trend toward later first births is mirrored and more pronounced; countries such as the Netherlands, Denmark and Spain find that their first-time mothers now have a median age near 30 (Mirowsky, 2002). Similarly, the US, New Zealand and Australia have witnessed parallel trends (Barnes, 2003; Ventura et al, 2001; Woodward, Fergusson & Horwood, 2006).

Along with the changes that have occurred over the past four decades in teenage fertility rates and delayed first births, the marital context of teenage parenthood has also altered. During the 1950s, 71% of known births to teenage women, in the UK, took place inside of marriage (Berrington et al, 2005)¹. However, over successive decades, the percentage of post-marital teenage births dropped substantially; 41% of births to teenage women in the 1960s occurred inside of marriage, and in the 1970s, this figure fell to just 17% (Berrington et al 2005). Drawing on the data from the general household survey 2000-2001, Berrington and colleagues suggest that just over half of the increase in extra-marital births to teenage women can be attributed to couples cohabiting but not marrying. However, for recent cohorts, the most common context of teen parenthood is outside of any co-residential

¹ This figure is likely to be an over estimate of the number of births to teenage mothers that occurred inside of marriage due to the number of 'concealed' pregnancies. Before the changes in abortion laws and the relaxation of social attitudes toward extra-marital childbearing 'concealed pregnancies' to teenage mothers were highly prevalent and under-reported (see Dunnell, 1979).

partnership; among cohorts born in 1970s, approximately 50% of adolescent births occur to women who do not live with the child's biological father.

It is likely that the demographic shift toward delayed parenthood is attributable to several factors that operate at both ends of the age at birth continuum. Across the industrialised nations, an array of policy and intervention initiatives that stress both abstinence and contraception have been devised and implemented to reduce the number of births to teenage women. For example, in 1999, the UK government set up the Teenage Pregnancy Unit, who set a core strategy to halve the number of conceptions among under-18s by 2010 (Teenage Pregnancy Unit, 2007). Since the implementation of this strategy, the number of teenage conceptions has decreased; between 1999 and 2003, a net reduction in conceptions of 3.2% has been reported (Wilkinson et al, 2006). Over the same time period, a net reduction of 10.6% in births to teenage women was also recorded; however, this reduction in teenage births is largely attributable to the 7.5% net increase in abortions among under 18s (Wilkinson et al, 2006).

At the other end of the age at first birth continuum, a number of factors are in operation. Delayed marriage, prolonged education, high divorce rates, advances in contraceptive methods, and the female pursuit of careers have all contributed to postponed childbearing (Barber, 2001; Heck et al, 1997). In addition, advances in compensatory fertility treatments and increased access to such services have made it possible to delay pregnancy (Borini et al, 2004; Golombok, 2002). However, recent commentaries on this topic have questioned whether advances in reproductive technologies may actually lull women into infertility (see Bewley, 2005).

1.3. Maternal Age at First Birth as a Risk Marker for Children's Developmental Outcomes

The literature on the consequences of early parenthood on maternal and child development, and the resultant governmental and professional interest is dominated by a focus on teenage parenthood. Across the industrialised nations, studies that have followed up the offspring of teenage mothers have documented an array of adverse outcomes across a number of domains of functioning. With few exceptions (e.g. Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Fergusson & Woodward, 1999), much of what is known about the development of children born to adolescent mothers is derived from national longitudinal surveys, and these designs contain only basic measures of mother and child functioning. Thus, in-depth, descriptive data are scarce due to a reliance on single-informant questionnaire methods. However, in recent years, longitudinal studies that contain more detailed assessments of children's cognitive, behavioural and emotional development have emerged (e.g. Black et al, 2002, 2002b; Moffitt et al, 2002). Nonetheless, because these longitudinal studies are relatively recent, much more is known about the ontogeny of offspring born to teenage parents in early childhood than in later childhood and adolescence.

1.3.1. Infancy

In general, and when compared to infants born to older women, the offspring of teenage mothers have higher mortality rates and lower birth weights (Elfenbein & Felice, 2003; Kirchengast & Hartmann, 2003; Pevalin, 2003). They suffer more health-related problems as neonates, and they are at a greater risk of physical neglect and abuse (Stevens-Simon, Nelligan & Kelly, 2001; Rodgers, Peoples, Sheps, & Suchindran, 1996). As development progresses, infants born to adolescent mothers

obtain lower scores on the mental development index of the Bayley Scales at 6 months of age (Pomerleau, Scuccimarri & Malcutt, 2003), and their attachment relationships in the second year of life are often described as avoidant or insecure (Lamb, Hopps & Elster, 1987; Spieker & Bensley, 1994). However, adverse health related outcomes and sub-optimal attachment relationships are not always found (Andreozzi et al, 2002; Pardo, Nazer, & Cifuentes, 2003), and many infants born to young mothers follow typical patterns of development. In addition, within age group variability has been reported: babies born to girls in their early to mid adolescent years are at greater risk of adverse outcomes than the infants of older adolescents (Cooper, Leland, & Alexander, 1995; Furstenberg, 1992; Kirchengast & Hartmann, 2003).

1.3.2. *Early to Middle Childhood.*

When compared to the offspring of older parents, children born to adolescent mothers score lower on standardised tests of cognitive ability (Manlove, 1997; Moffitt et al, 2002; Moore & Snyder, 1991; Sommer et al, 2000) and they are significantly more likely to be referred to special educational services (Gueorguieva et al, 2001; Moffitt et al, 2002). However, it is important to note that elevated rates of learning difficulties are not observed in all samples (Williams & Decoufle, 1999). Nonetheless, while delays in cognitive development are not inevitable, epidemiological surveys estimate that up to 10% of children born to adolescent mothers will be diagnosed with a learning difficulty (Broman, 1981), a prevalence rate that is approximately 3 times greater than that found in the general population (Whitman, Borkowski, Schellenbach, & Nath, 1987).

In terms of behavioural problems, the offspring of adolescent parents display elevated rates of externalising symptoms on standardised questionnaires (Black et al, 2002, 2002b; Leadbeater, Bishop, & Raver, 1996; Sommer et al, 2000), and the absolute levels of these aggressive and non-compliant behaviours are found to be higher in the children of teenage as opposed to older age mothers (Moffitt et al, 2002). In addition, children born to adolescent mothers show increased difficulties in the socio-emotional domain of functioning: elevated scores on the depression, anxiety and withdrawn behaviour subscales of the Achenbach Child Behaviour Checklist are frequently reported (Black et al, 2002, 2002b; Miller, Miceli, Whitman & Borowski, 1996; Moffitt et al, 2002; Sommer et al, 2000).

However, when reviewing the childhood and adolescent outcome literature, it is important to keep two key findings in mind. Firstly, women who enter into parenthood in their teenage years are likely to confer risk to their children, irrespective of whether they are actually teenagers at the time of subsequent births (Berrington et al, 2005; Jaffee et al, 2001; Moffitt et al, 2002). Thus, first born and non-first born children are at elevated risk. Secondly, even though the offspring of teenage mothers are at elevated risk, adverse outcomes are not inevitable. Heterogeneity in functioning among the offspring of adolescent mothers has been noted, and many children and adolescents show adaptive patterns of adjustment (Furstenberg, Hughs, & Brooks-Gunn, 1993; Jaffee et al, 2001).

1.3.3. Adolescence and Early Adulthood

The few studies that have followed up the offspring of teenage mothers into adolescence have found that the differences between children born to teenage and older mothers often widen over time (Coley & Chase-Lansdale, 1998; Furstenberg,

Brooks-Gunn, & Morgan, 1987; Brooks-Gunn & Furstenberg, 1986). As is the case with the childhood literature, much of the research on adolescent development in the context of teenage parenthood is derived from US samples. However, the two large New Zealand cohort studies, the Christchurch Health and Development Study, and the Dunedin Multidisciplinary Health and Development Study, are both prominent contributors of high quality research in this area (Fergusson & Woodward, 1999; Jaffee et al, 2001). Providing evidence of continuity in development, adolescents born to teenage mothers tend to experience a range of unfavourable outcomes. In early adolescence, these include low cognitive test scores, poor academic achievement, elevated rates of behavioural and emotional problems, higher rates of alcohol and cigarette use, and increased contact with the criminal justice system (Fergusson & Lynskey, 1993; Hofferth & Reid, 2002; Shaw, Lawlor, & Najman, 2006).

Into late adolescence and early adulthood, the offspring of teenage mothers continue to show patterns of maladjustment. Analyses conducted on US datasets report that substance abuse, gang membership, and high unemployment rates are outcomes frequently experienced by the offspring of adolescent childbearers (Hardy, Astone, Brooks-Gunn, Sharpio & Miller, 1998; Haveman, Wolfe, & Peterson, 1997; Horwitz et al, 1991; Pogarsky, Thornberry, & Lizotte, 2003, 2006). Evidence of cross-cultural consistency in the effects of early parenthood can be observed in studies conducted in New Zealand. For example, the young adult offspring of adolescent mothers show higher rates of educational under-achievement, unemployment, criminal convictions, and mental health problems (Fergusson & Woodward, 1999; Jaffee et al, 2001). What is clear, is that few (if any) studies have followed up the

adolescent offspring of teenage mothers in the UK, and for those that have, the focus has primarily been on the intergenerational transmission of teenage parenthood.

1.4. The Intergenerational Transmission of Teenage Parenthood

The intergenerational transmission of teenage parenthood is one of the most robust and widely replicated findings across birth cohort and country (East, Reye, & Horn, 2007; Horwitz et al, 1991; Jaffee et al, 2001; Kahn & Anderson, 1992; Kiernan, 1997; Manlove, 1997; Maughan & Lindelow, 1997; Woodward et al, 2006), and this cycle of teenage parenthood across multiple generations of the same family is central to policy and intervention initiatives in the UK and abroad (Maynard, 1997; Teenage Pregnancy Unit, 2007). Undoubtedly, governmental and professional interest in this pattern of early motherhood is derived from the observation that the intergenerational transmission of social exclusion, health inequalities and teenage parenthood are inextricably linked (Social Exclusion Unit, 1999). Thus, researchers have sought to identify the proximal and distal factors in operation at the individual and societal level that predict a transition to parenthood in the teenage years.

1.5. The Antecedents of Teenage Parenthood

The large UK cohort studies, namely the National Survey of Health and Development (NSHD), and the National Child Development Study (NCDS), have been widely used to examine the antecedents of teenage parenthood. The NSHD, which began in 1946, and the NCDS, which began in 1958, have both attempted to follow-up a birth cohort born in the first week of March of the respective year. However, due to the requirement of complete data on the measures used at each assessment phase, high attrition rates are often observed, particularly among teenage

mothers (Maughan & Lindelow, 1997). Nonetheless, across numerous sets of analyses conducted on both samples, a host of individual and environmental characteristics, prospectively measured in childhood and adolescence, have been consistently identified as predisposing factors to teenage parenthood. Educational underachievement, socio-economic disadvantage, being the child of a teenage mother, and having an earlier ideal age of first pregnancy have all been highlighted as predictors of adolescent motherhood (Kiernan, 1980, 1997; Manlove, 1997; Maughan & Lindlow, 1997; Russell, 2002). In addition, for the most recent cohort (NCDS), a high level of adolescent conduct problems has also been established as an antecedent of teenage motherhood (Maughan & Lindlow, 1997).

Across the industrialised nations, a similar set of childhood and adolescent predictors of teenage motherhood have been identified. In New Zealand, conduct problems, educational under-achievement, socio-economic disadvantage, higher rates of physical punishment, exposure to parental separations, and having a mother who herself was a teenager when she entered parenthood have all been highlighted (Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Jaffee 2002; Woodward et al, 2006). Likewise, a similar set of predisposing factors to teenage motherhood have been identified in the US (Gest, Mahoney, & Cairns, 1999; Hoffman, Foster, & Furstenberg, 1993; Horowitz et al, 1991; Klipinger, Lundberg, & Plotnick, 1995; Miller-Johnson et al, 1999; Upchurch & McCarthy, 1990; Xie, Cairns, & Cairns, 2001) and in Europe (Nebot, Borrell, Villalbi, 1997; Olausson, Haglund, Weitoft, & Cnattingius, 2001).

In line with these findings, a similar set of antecedents have been identified for early fatherhood, which is typically defined as occurring before the ages of 23 or 25 (Berrington et al, 2005; Dearden et al, 1994; Fagot et al, 1998; Kiernan, 1997;

Thornberry et al, 1997; Woodward et al, 2006; Xie et al, 2001). However, being the son of a teenage mother is not a reliable predictor of early fatherhood (Kiernan, 1997; Woodward et al, 2006). Nonetheless, what is clear from the extant literature, is that an early entry into parenthood is a non-random event; those young people who typically make the transition to parenthood in their teenage years (and early twenties for fathers) often possess a host of individual and environmental characteristics that are identifiable in childhood and/or adolescence.

1.6. Teenage Motherhood as a Marker of Adverse Maternal Outcomes

As well as being drawn upon to identify the antecedents of teenage parenthood, the longitudinal datasets of the UK, the US, and New Zealand have been used to examine the social consequences that a teenage birth has for the mothers' later life functioning. The UK, the US, and New Zealand have the highest rates of teenage motherhood in the developed world, and adolescent pregnancy is high on the political agenda in these countries (Furstenberg, 2003; UNICEF, 2001). As such, much of the research reviewed in this section originated from these nations. In general, a teenage birth has been found to be associated with a number of adverse economic and family structure indices. When in their late twenties and early thirties, teenage mothers often encounter high rates of poverty, welfare dependency, poor housing conditions, partnership dissolution, single parenthood and additional non-marital births (Berrington et al, 2005; Hobcraft & Kiernan, 2001; Jaffee, 2002; Maughan & Lindelow, 1997; Moffitt et al, 2002).

However, in contrast to the research that has documented the adverse economic and family structure conditions of teenage mothers, far less attention has been paid to their psychological functioning. It is likely that such a restrictive account

of the mother's development has occurred because these large scale survey designs did not initially set out to explore the correlates and consequences of teenage motherhood. In addition, the initial stages of these studies often predated the conception and development of processes and measures of current import (Maughan & Lindelow, 1997). As a consequence, in-depth, descriptive data pertaining to the mother's mental health is lacking. Nevertheless, as the studies matured, brief symptom inventories that reflect mainly affective symptomatology were often included in the study protocol. However, these measures only reflect the mothers' level of psychological functioning in the preceding week, and by their very nature, scores on these questionnaires only identify women displaying a high degree of 'psychological distress'.

An innovative, comparative analysis of the NSHD and NCDS cohorts examined the evidence for a secular trend in the risk of affective symptomatology among teenage mothers (Maughan & Lindelow, 1997). Participants in each study were born twelve years apart (1946 and 1958), and information on affective symptomatology was collected at age 36 in the 1946 cohort, and at age 33 in the 1958 cohort. Between study comparisons revealed that the proportion of teenage mothers evidencing a high degree of 'psychological distress' was greater in the later cohort (Maughan & Lindelow, 1997). Thus, the implication here is that as teenage motherhood was becoming a less common pathway for the women in the later cohort, its consequences in terms of psychological functioning were becoming more severe.

In the context of other longitudinal cohort designs, convergent and divergent results have been reported. Berrington et al (2005) find that at age 30, the teenage mothers in their sample are over twice as likely as mothers aged 20 and above to have a high score on the malaise inventory: a self-report questionnaire that measures

emotional distress, somatic complaints and symptoms of anxiety and depression. In contrast, in her analysis of the mental health outcomes of teenage mothers, early twenties mothers (women who had given birth between the ages of 20-26 years), and women who had not yet given birth by age 26 (childless women), Jaffee (2002) finds that the teenage mothers are no more likely than the other two groups to score highly on a DSM-IV based depression symptom scale. In contrast, early twenties mothers, but not teenage mothers, were more likely than the childless group to score highly on a comparable anxiety scale. Thus, in the context of longitudinal cohort designs, consistent and inconsistent results have been reported.

Whilst being an important resource, the longitudinal cohort studies generally contain only basic measures of the mothers psychological functioning, and frequently, one-off assessments that reflect just the level of symptomatology in the preceding week are conducted. Symptom severity, as assessed by self-report questionnaires does not necessarily translate to clinically significant psychopathology, especially when reports refer to the level of functioning in a single week. In addition, information pertaining to the onset of the mother's symptoms, the duration of their presence, and the extent to which they impair daily functioning is rarely ascertained. In light of these deficiencies, a more detailed discussion of maternal psychopathology and age at first birth, and its relation to children's developmental outcomes will be provided in chapter 2.

1.7. Theoretical Explanations for the Adverse Outcomes Experienced by Teenage Mothers and Their Children

1.7.1. Age is Not a Causal Variable

It is intuitively clear that chronological age at entry into parenthood is an unlikely causal variable. Therefore, teen age per se cannot explain the adverse outcomes often experienced by adolescent mothers and their children. This sentiment is echoed in the writings of prominent developmental theorists, who have long pointed out the need to isolate the particular variables that actually determine, or mediate, the variation of behaviour with age (Kessen, 1960; Wohlwill, 1970). This point was eloquently put by Joachim Wohlwill:

‘Age as it is asserted, is at best a shorthand for the set of variables acting over time, most typically identified with experiential events or conditions, which are in a direct functional relationship with observed developmental changes in behaviour; at worst it is merely a cloak for our ignorance in this regard.’ (Wohlwill, 1970, pp 50)

Thus chronological age (in this context the mother’s chronological age at first birth) should be viewed as a marker for a number of associated individual and environmental characteristics that are hypothesized to have an adverse affect upon maternal and child functioning. Following on from this perspective, the discussion will now progress to outlining potential explanatory processes.

Historically, the literature on teenage parenthood has largely been borne out of sociological, economic, epidemiological and demographic traditions. It is only recently that research adopting a psychological perspective has blossomed (Coley & Chase-Lansdale, 1998). Consequently, developmental theory has rarely been applied

to this literature, and empirical evidence is often discussed without reference to an over-arching theoretical standpoint. As a result, the findings from these divergent perspectives that pertain to explanatory processes require a theoretical framework to guide method and discussion: developmental theory can provide such a scaffold.

1.7.2. Life Course Theory as a Framework for the Study of Age at Entry into Parenthood

The life course perspective emerged during the 1960's in response to the need for a way of thinking about development within the context of changing lives and times (Elder, 1975). From this viewpoint, developmental importance is assigned to the changing social, cultural, and physical environments of individuals, and the theory proposes that issues of adult development are fundamental to understanding the ontogeny of children (Elder, 1975). The concept of the life course refers to a sequence of socially defined, age-graded events and roles that a person enacts overtime: birth, puberty, and death are biological facts, but their meanings in the life course are social truths or constructions (Elder, 1997). This perspective draws upon socio-cultural theories of age, which emphasise the social meanings of age, and the timing and order of major life transitions (Elder, 1998; Gulliver, 1968; Neugarten, Moore, & Lowe, 1965). Two core concepts central to the life course perspective are key to the current line of enquiry: 'off-time transitions' and 'selection effects'. The defining features of these two concepts, along with their ability to help illuminate the reasons why teenage parenthood is associated with increased risk for mothers and children, will now be discussed.

1.7.2.1. Selection Effects

Life course theory proposes that the adverse outcomes experienced by young mothers and their children can be attributed to the mothers pre-existing selection characteristics. The concept of 'selection effects' refers to the proposition that individuals with distinct social and psychological attributes (e.g. a low IQ and/or a predisposition to psychopathology) select into particular non-normative, off-time transitions, and that it is these pre-existing characteristics that explain the risk for later adverse outcomes (Elder, 1997). Life course theory postulates that during times of non-normative, less socially regulated transitions (e.g. teenage parenthood), prominent attributes that people bring to the new role or situation are often accentuated (Elder & O'Rand, 1995). From this viewpoint, the adverse outcomes experienced by teenage mothers and their children are accounted for by pre-childbearing maternal characteristics that are often amplified during times of non-normative transitions. Thus, the implication here is that these pre-existing maternal characteristics would put young mothers and their offspring at risk, even if these young women delayed their entry into parenthood until a more normative age.

Research consistent with the selection effects principle can be obtained from a number of sources. Firstly, certain psychological characteristics, such as low childhood IQ and adolescent conduct disorder, significantly increase the risk of early parenthood (Bardone et al, 1996; Fergusson, Horwood, & Ridder, 2005; Maughan & Lindelow, 1997). These pre-existing characteristics have been found to partly account for the adverse outcomes experienced by teenage mothers in later life (Fergusson & Woodward, 2000; Jaffee, 2002; Maughan & Lindelow, 1997). Secondly, studies that have examined the reasons why children born to teenage mothers show patterns of maladjustment have found that failing to account for the mothers' pre-childbearing characteristics overestimates the negative consequences of adolescent parenthood. For

example, children born to teenage mothers with a childhood history of conduct problems, educational under-achievement and poverty show elevated rates of adverse outcomes; however, when these pre-childbearing characteristics are taken into account, the child's risk of maladjustment is considerably reduced (Fergusson & Woodward, 1999; Jaffee et al., 2001). In other words, it is the pre-existing maternal characteristics that account for the child's difficulties.

Empirical findings that further illustrate the selection effects principle can be derived from a study that employed an alternative approach to that of statistically controlling for potentially confounding selection characteristics. Hotz, McElroy and Sanders (1997) devised a design akin to a natural experiment whereby women who had given birth as teenagers were compared to women who had become pregnant as adolescents but had experienced a miscarriage and subsequently gave birth in their early twenties. The researchers reasoned that if a teenage birth does cause adverse outcomes, then the women who had miscarried should fare better in adulthood as their miscarriage forced them to delay childbearing. By early adulthood, compared to the early twenties mothers, the teen mothers fared better: they worked more regularly, were more likely to complete further schooling, and they, and their partners, earned a significantly higher wage. Thus, this research suggests that women who become pregnant as adolescents are at risk, irrespective of whether they actually give birth as teenagers or delay childbearing until their early twenties.

1.7.2.2. *Off-time Transitions*

In contrast to the view point that the adverse outcomes experienced by young mothers and their children are attributable to the mother's pre-childbearing characteristics is the proposal that such detrimental outcomes are a direct consequence

of the mother's off-time' transition to parenthood (Elder, Caspi, & Burton, 1988). Life course theory posits that transitions along major life course trajectories are, in general, expected to occur in orderly sequence (e.g. marriage before parenthood), and at certain stages of development. Teenage parenthood is a disorderly sequence, and as such, represents an 'off-time transition' (Elder, 1997). Off-time transitions (i.e. those that are very early or very late in terms of cultural norms) are believed to have developmental implications for individuals and their families through their cumulative behavioural consequences (Elder, 1998). In this manner, an off-time-early transition to parenthood limits initial educational, social and economic opportunities, which in turn affect later maternal and child functioning via the consequences of these earlier limitations (Elder, Caspi, & Burton, 1988).

The concept of 'off-time transitions' and its associated attributes implies that teenage mothers and their children are at risk of adverse outcomes because of strong 'social influence' effects that result from teenage childbearing (Jaffee et al, 2001). Thus, the implication of this hypothesis is that the age at which a woman enters parenthood is critical in determining maternal and offspring risk for adverse outcomes. Therefore, this model predicts that by delaying entry into parenthood, a woman will accumulate the life experience, social capital, and appropriate knowledge that will improve her own and her child's development.

Evidence consistent with the social influence model can be derived from research that has found that in comparison to older mothers, young mothers are more likely to rear their children in adverse family environments. For example, the home milieu of adolescent child-bearers is often characterised by high levels of divorce, separation, poverty, and inter-parental conflict (Brooks-Gunn & Chase-Lansdale, 1995; Fergusson & Woodward, 1999; Jaffee et al, 2001; Moffitt et al, 2002;

Berrington et al, 2005). When these adverse family conditions are taken into account, researchers often find the magnitude of the difference between teen and older mother groups attenuates or disappears. For example, Fergusson & Woodward (1999) and Jaffee and colleagues (2001) find that the risk of adverse outcomes among the offspring of adolescent mothers is considerably reduced after the influence of sub-optimal parenting practices, family disruption and poverty are accounted for. Likewise, in their analysis of the NSHD and NCDS samples, Maughan & Lindelow (1997) find that contemporaneous reports of neighbourhood dissatisfaction and partnership dissolution partially account for the high malaise scores of teenage mothers. Thus, across a number of studies, different environmental conditions and events have been highlighted as explanatory processes that give rise to adverse outcomes for mothers and children.

In terms of explaining why it is that children born to teenage mothers experience adverse outcomes, maternal depression has been highlighted as a key determinant. In their analyses of the effects of teenage parenthood on 2- to 3-year-old children's risk of conduct, emotional and hyperactivity problems, Berrington and colleagues (2005) find that the mother's symptoms of anxiety and depression account for the observed association. Likewise, in two different samples of adolescent parents and their 3- to 5- year-old children, Black and colleagues (2002b) and Sommer and colleagues (2000) find that the mother's symptoms of depression predict children's behavioural and emotional problems. Collectively, these findings suggest that growing up in a household with a depressed mother is detrimental to children's behavioural and emotional adjustment. However, due to the concurrent measurement of maternal depression and indices of child maladjustment in these studies, the bi-directional nature of this relationship can not be discounted. In addition, while this

research suggests that children's outcomes should improve if intervention initiatives target and ameliorate an adolescent mother's mental health problems, detailed information on the onset and severity of the mother's symptoms, which would inform the timing and nature of the intervention, is lacking. It is also possible that psychopathology is a selection process that increases a young girl's propensity to teenage motherhood; if this is true, then intervention initiatives would need to begin at the onset of the mother's symptoms and before the child develops.

1.7.3. *A New Off-time Transition: Entry to Parenthood in the Early Twenties*

The foregoing discussion of life course theory in relation to a woman's age at first birth draws attention to the fact that contemporary young women who give birth in their early twenties may also be at risk. However, the vast majority of the literature on age at first birth and maternal and child development has focused exclusively on teenage parenthood, and typically, dichotomous comparisons between mothers aged 19 and under and mothers aged 20 and above are conducted. As discussed earlier, the last 4 decades have seen a dramatic shift in the age of entry into parenthood, with most contemporary young women deferring childbearing until their late 20s and early 30s. This demographic shift, evident across most industrialised countries, has increased substantially the disparity between teenage and normative age parenthood; and recent findings suggest that teenage motherhood may now be more deviant and disadvantaging than in decades past (Maughan & Lindelow, 1997; Moffitt et al, 2002). In addition, this demographic shift toward later parenthood raises the possibility that mothers who enter into parenthood in their early twenties may also be at risk, given their substantially off-time-early entry to parenthood relative to the norm.

Against the general background of delayed marriage and parenthood, the early twenties have been conceptualised as a period of emerging adulthood, characterised by the frequent change and exploration of possible life directions (Arnett, 2000). For most young people living in industrialised countries, the late teens through the early twenties (ages 18-25) are years of profound change and personal growth; career options are explored, different romantic relationships are tested, and many young people leave the parental home and place of origin to further their education and experiences (Arnett, 2006). Along with these changing demographic patterns, cultural norms and expectations have also altered. Over the past half century, religious prescriptions and sexual attitudes have relaxed, and young people are granted more autonomy and opportunity to explore possible life pathways with less parental, and societal, instruction. It is not surprising then, that most young people choose to postpone family life during this volitional, dynamic and uncertain period of development.

Entry into parenthood during the early twenties then may inhibit life opportunities and personal growth. Career development and educational advancement would be limited by childbearing in the early twenties, and this may have negative implications for parents and children. Parents in their early twenties may make comparisons with their peers, whose opportunities to participate in education and to explore different careers and relationships are not restricted by parental responsibilities. These comparisons may lead to negative evaluations of the parenting role, or indeed attempts by early twenties parents to engage in the risky, experimental activities of their cohort members. The prevalence of several types of risk behaviours such as illegal substance misuse, unprotected sex, and binge drinking, have been found to peak in late adolescence and the early twenties (Arnett, 1992; Bachman,

Johnston, O'Malley, & Schulenberg, 1996), and many mental illnesses onset by or during these years (Kessler et al, 2005). Thus, it is possible that the correlates and consequences of parenthood in the early twenties are similar to those of adolescent parenthood. Therefore, early twenties childbearing warrants attention as a marker of adverse outcomes for mothers and children.

The few studies that have extended their analyses and considered early twenties parenthood as a risk factor in the same way as teenage parenthood suggest that the correlates and consequences of both off-time transitions are markedly similar. Findings from the Carolina Longitudinal Study reveal that children from low socio-economic backgrounds who under-achieved in school, were aggressive, and were unpopular with their peers were the most likely to become parents before age 20, and before age 23 (Gest et al, 1999; Xie et al, 2001). Similarly, Woodward et al (2006) find a consistent set of predictors for entry into parenthood before 18, and entry into parenthood before age 25. Likewise, in terms of the mother's risk of adverse outcomes (e.g. high malaise scores, single parenthood and poverty), Hobcraft and Kiernan (2001) find that the most dramatic contrasts arise when comparisons are made between mothers who had their first birth before age 23 and women who entered parenthood between 23 and 32 years. However, the risk of adverse outcomes was greater for the teen mothers in this sample. Finally, although no study has specifically tested whether children born to early twenties mothers are as (or even more) likely as the offspring of teenage mothers to show patterns of maladjustment, the findings of Fergusson & Woodward (1999) suggest that a child's risk of adverse outcomes decreases, as the mother's age increases. Thus, taken together, these findings suggest that in any analysis of maternal age at entry into parenthood in

relation to mother and child functioning, attention needs to be given to early twenties mothers and their children.

1.7.4. *Early Experience*

As well as highlighting the significance of ‘selection characteristics’ and the consequences of an ‘off-time early’ transition to parenthood for young mothers, developmental theory draws attention to the importance of early experience effects on their children. Early life experiences have long been regarded to have a profound effect upon children’s subsequent development (Kessen, Haith & Salapatek, 1970). Theories pertinent to such pre-programming hypotheses are set forth in the work of a number of prominent authors. For example, attachment theory (Bowlby, 1958; Ainsworth, 1969), ethology theory (Lorenz, 1970), and more recently the foetal programming hypothesis (Barker, 1998; O’Keane, 2006; O’Connor, 2003) all highlight the significance of the antenatal and postnatal environment. Common to all of these hypotheses is the proposal that adverse experiences in early life, be they in the womb, or during infancy, have an adverse effect upon children’s subsequent development because of their impact upon the child’s developing cognitive and biological systems. Thus, in any study of the reasons why young mothers and their children experience adverse outcomes, attention to the antenatal and postnatal environment may prove illuminatory and informative.

1.8. Summary

In general, teenage parenthood is associated with an elevated risk of adverse outcomes for mothers and children. Large scale survey studies find that in adulthood, the lives of teenage mothers are often characterised by socio-economic deprivation, family instability, and emotional distress. However, in-depth descriptive data on the mothers' psychological functioning is lacking. Throughout development, the offspring of young mothers show developmental deficits and patterns of maladjustment across a number of domains of functioning. Nevertheless, few studies follow-up children born to teenage mothers into late childhood and early adolescence, especially in a UK context. Additionally, in terms of decreasing the risk adolescent parenthood poses to children's' development, reducing the mothers' level of psychological distress has been highlighted as a point of intervention (Berrington et al, 2005).

Over the last 4 decades, the industrialised nations have seen a dramatic shift toward delayed parenthood, and most women now defer childbearing until their late 20s and early 30s. As a consequence of this demographic shift, the question has been raised as to whether mothers who enter into parenthood in their early twenties and their children are also at risk. Given their substantially off-time-early entry into parenthood relative to the norm, early twenties mothers and their children are hypothesised to be at comparable levels of risk as teenage mothers and their offspring. Thus, as well as studying the psychological functioning of adolescent mothers and their children, this thesis will examine the experiences of young women who made the transition to parenthood in their early twenties and their children.

Historically, the literature on young motherhood has been borne out of sociological, economic, epidemiological and demographic traditions. As a result, the findings from these divergent perspectives require a theoretical framework to help

elucidate the processes that give rise to the adverse outcomes often experienced by young mothers and their children. The research contained in this thesis will adopt a developmental perspective when investigating the psychological correlates and consequences of an early transition to parenthood for mothers and children. Core principles of life course, emerging adulthood, and early experience theory will be drawn upon to inform, and to guide, the empirical studies of this thesis. Prior to the presentation of the empirical studies contained in this thesis, and to help locate the reader, it is necessary to begin with a detailed discussion of young motherhood, maternal psychopathology, and children's development.

Chapter 2

Early Parenthood, Maternal Psychopathology and Children's Cognitive, Behavioural and Emotional Development

2.1. Introduction

The preceding review has demonstrated the importance of taking into account mental health when evaluating the effect of early parenthood on outcomes for women and children. Therefore, it is essential to consider issues concerning maternal mental illness during the childbearing years. Over the past three decades, much attention has been paid to depressive illness following childbirth (e.g., Murray & Cooper, 1997). More recently, scientific interest has been drawn to depressive and anxious symptomatology during pregnancy (O'Keane, 2006; O'Connor, Heron, Golding, Beveridge, & Glover, 2002). However, in neither literature has much attention been given to the mental health of younger mothers (Bennett et al, 2004). In addition, in studies that have investigated the association between the mother's mental state and the child's development, young maternal age at entry into parenthood has often been used as a sample exclusion criterion (Murray, 1992).

This chapter will review the literature on maternal mental illness during the childbearing years. To begin, the evidence base on mental illness in mothers, before and after childbirth, will be presented. Next, the discussion will progress with a summary of the empirical evidence which demonstrates the negative impact that maternal psychopathology has upon children's development. Following this, a detailed analysis of the study of mental illness in samples of young mothers will be

conducted. Finally, this chapter will conclude by outlining the research questions that will be addressed in the empirical chapters of this thesis.

2.2. The Timing of Maternal Mental Illness: Postnatal Depression

Depression is twice as common in women as it is in men, and the prevalence of depression among women peaks during the childbearing years (Brown & Harris, 1978; O’Keane, 2000; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993). Over the past three decades, much attention has been drawn to depressive illness following childbirth, and it has been estimated that the prevalence of postnatal depression (PND) ranges between 8 and 15% (O’Hara, 1997). However, estimates of the prevalence of PND vary widely between studies, depending on the measurement technique, the definition of PND, and the population of interest. In general, questionnaire methods produce higher prevalence rates than diagnostic interviews, and young mothers appear more vulnerable to postnatal depression than older mothers; typically, the rates of depression in the postnatal period among teenage mothers are twice those of mothers aged 20 and over (see Table 2.1).

The occurrence of postnatal depression is linked with problems for the mother, the marital relationship, and children’s development (Hay & Kumar, 1995; Murray & Cooper, 1997; Robertson, Grace, Wallington, & Stewart, 2004), and PND is highly predictive of recurrent depressive episodes (Coleman, Ghodsian, & Wolkind, 1986; Davidson & Robertson, 1985; Halligan, Murray, Martins, & Cooper, 2007). However, the nosological distinctiveness of postnatal depression from episodes of depression occurring outside of the postnatal period is hotly debated. For example, substantial differences in the clinical presentation of PND from episodes of

depression that occur at other points in the life course have not been found (Cooper et al, 2007; Wisner, Peindl, & Hanusa, 1994; Whiffen & Gotlib, 1993).

Furthermore, researchers have questioned whether the birth of an infant does in fact trigger an episode of depression (O'Hara, 1997). For example, comparisons between postnatal women and their non-childbearing acquaintances (thereby attempting to control for socio-demographic factors) have not found significant differences in the rates of depressive illness (O'Hara, Zekoski, Philipps, & Wright, 1990; Troutman & Cutrona, 1990). On the other hand, some studies have found postnatal episodes to be more severe than non-postnatal episodes (Hendrick, Altshuler, Strouse, & Grosser, 2000; O'Hara et al, 1990), and other studies find episodes of PND to be significantly longer in duration (Cooper et al, 2007). While this literature is complicated by contradictory findings, there is a general consensus that the postnatal period is often associated with deterioration in women's psychological functioning (Cooper et al, 2007; O'Hara et al, 1990; Seto, Cornelius, Goldschmidt, Morimoto, & Day, 2005)

2.2.1. Postnatal Depression: Outcomes for Children

Maternal depression is a well-known risk factor for children's development (Cummings & Davies, 1994; Goodman & Gotlib, 1999). Particular attention has been drawn to the timing of the child's initial exposure to a mother's depressive illness, and a collection of studies have demonstrated links between PND and children's subsequent development (Murray & Cooper, 1997). In infancy, the offspring of mothers suffering from postnatal depression show cognitive and regulatory disturbances (Field et al, 1995, Galler, Harrison, Ramsey, Forde, & Butler, 2000; Murray, 1992). In childhood, cognitive impairments persist (Hay & Kumar, 1995),

and in adolescence, cognitive and socio-emotional deficits have been documented (Essex, Klein, Miech, & Smider, 2001; Halligan, Murray, Martins, & Cooper, 2007; Hay, Pawlby, Waters and Sharp, 2008; Murray et al, 1999). Thus, children exposed to PND show similar patterns of maladjustment as the offspring of teenage mothers (see Chapter 1).

Attention to the timing of initial exposure to maternal depression arose from prior theory and empirical evidence which asserts that experiences in infancy have a profound effect upon subsequent development. Models pertinent to this pre-programming hypothesis are set forth in the work of prominent authors; for example attachment theory (Bowlby, 1958; Ainsworth, 1969), ethology theory (Lorenz, 1970), and the ‘critical periods’ theory (Beach & Jaynes, 1954; Hess, 1959). Postnatal depression has been found to disrupt the quality of the caregiving environment (Campbell, Cohn, Flanagan, Popper & Meyers, 1992; Murray et al, 1993), and such disturbances are believed to have long lasting effects via their impact upon the developmental tasks of infancy. For example, PND is thought to disrupt attachment formation and infants’ ability to learn to regulate their attention and emotions (Goodman & Gotlib, 1999; Hay, 1997). Thus, parenting difficulties have been highlighted as a key determinant of child maladjustment in the context of postnatal depression.

In the UK, empirical findings on postnatal depression have had a noteworthy effect upon policy and practice, and this literature has led to the development of clinical guidelines to screen for and manage PND (e.g., National Institute for Clinical Guidelines, NICE, 2007; Scottish Intercollegiate Guidelines Network, SIGN, 2002). Health visitors and other members of the primary care team routinely screen for postnatal depression, and intervention initiatives such as the Flying Start programme

(Flying Start, 2007) and the Family Nurse Partnership (Olds et al, 2007) have policies that address the mother's emotional well being. In contrast, clinical focus, and until recently academic research, has paid less attention to the impact of maternal psychopathology in pregnancy, despite the fact that pregnancy is potentially the period in a woman's life course where the risk of psychopathology is at its highest (Evans et al, 2001; O'Keane, 2006).

2.3. The Timing of Maternal Mental Illness: Antenatal Depression

Traditionally, pregnancy has been thought of as a period of emotional well-being and satisfaction for the expectant mother (Bonari et al, 2004); and this was the accepted viewpoint in the medical and psychiatric professions (O'Keane, 2006). Likewise, pregnancy has previously been described as a time period during a woman's life course where the risk of psychiatric illness is decreased (Bonari et al, 2004; Buist, 2000; Nonacs & Cohen, 2003), suggesting that pregnancy 'protects' women against the development of a mental illness. As a consequence of this perspective, research and clinical focus in perinatal psychiatry has been largely centred upon the months following childbirth (O'Keane, 2006), and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) gives special emphasis to postnatal but not to antenatal mood disorders (American Psychiatric Association, 2000).

However, recent empirical studies have documented higher levels of depressive and anxious symptomatology in the antenatal relative to the postnatal period (Evans et al, 2001; Heron et al, 2004; Rubertsson et al, 2005), and empirical studies that have used operationally defined criteria to diagnose disorder have found that approximately 30-50% of PND cases have an onset in pregnancy (Hobfoll et al,

1995; Gotlib, Whiffen, Wallace, & Mount, 1991). There is high comorbidity between depression and anxiety, and they represent the most common forms of mental illness (Kendler, Gardner, Gatz, & Pedersen, 2007; Maser & Cloninger, 1990; Moffitt et al., 2007). Depressive and anxiety disorders are symptomatically similar (O’Keane, 2006), their genetic risk factors are highly correlated (Kendler et al, 2007; Roy, Neale, Pederson, Mathe, & Kendler, 1995), and analogous treatments are used for these affective disorders (Schneiner et al, 2003). Similarly, antenatal depression and anxiety are highly associated, and anxiety symptoms in pregnancy predict depressive symptoms post partum (Heron et al, 2004).

2.3.1. Psychopathology and the Antenatal Period

Estimates of the prevalence of psychopathology in pregnancy have predominately focused upon depressive disorders, and questionnaire-based methods dominate this literature. Prevalence estimates for antenatal depression vary widely between studies, depending on the measurement technique, the population of interest, and the trimester of pregnancy in which the results were recorded. In general, questionnaire methods produce higher prevalence rates than semi-structured diagnostic interviews (see Bennett et al, 2004), and cohort studies that canvass the emotions and feelings of women from a broad range of socio-economic groups find greater frequencies of depressive symptoms than studies that have more selected samples, such as married women, mothers of mid to high socio-economic status, and women aged 18 and over (Evans et al, 2001; Marcus et al, 2003; Affonso, Lovett, and Sheptak, 1990; O’Hara, Zekoski, Phillips, Wright, 1990). Unfortunately, there is little data on the prevalence of anxiety disorders in pregnancy (O’Keane, 2006), and none of the questionnaire scales used to screen for perinatal anxiety disorders have been

found to be sensitive or reliable (Huzinek et al, 2000). Thus, subsequent discussion will focus on antenatal depression.

2.3.2. The Prevalence of Antenatal Depression

Recently, a meta-analysis into the prevalence of antenatal depression identified 21 relevant articles (Bennett et al, 2004). The majority of these articles were published post 2000, reflecting the increasing interest in the topic. Of the 21 articles identified, 7 used a standardised psychiatric interview to identify cases of antenatal depression (e.g. Schedule for Affective Disorders and Schizophrenia [SADS], Endicott & Spitzer, 1978). The remaining articles used a self-report questionnaire, either the Edinburgh Postnatal Depression Scale (EPDS, Cox, Holden, & Sagovsky, 1987) or the Beck Depression Inventory (BDI, Beck, Steer, & Garbin, 1988). Caseness for depression in the questionnaire studies was determined by taking all women who scored above a specified cut-score. Studies on samples of teenage mothers were excluded from the meta-analysis, and age at first birth was not considered (Bennett et al, 2004).

Bennett et al (2004) reported the point prevalence of depression by trimester, estimating 7.4% of women to be depressed in the first, 12.8% in the second, and 12% in the 3rd trimesters of pregnancy. Trimester prevalence rates were not significantly different. In line with previous findings, studies using the BDI reported significantly higher rates of antenatal depression than those using diagnostic interviews, though such differences were not noted when the comparison was repeated using the EPDS. However, due to the presence of heterogeneity in the rates of antenatal depression across the included studies, and because of many methodological problems, the

authors concluded that their pooled prevalence rates are ‘conservative’ estimates (Bennett et al, 2004).

In line with the prevalence rates reported by Bennett and co authors are the findings of a more recent meta-analysis that used only semi-structured diagnostic interview studies (Gavin et al, 2005). Twelve studies were identified by Gavin and colleagues and the authors report rates by trimester and a period prevalence estimate that reflects the number of women who experienced an episode of depression at any point in their pregnancy: a statistic that Bennett et al (2004) did not produce. In the Gavin et al study, 11% of women were depressed in the first trimester and 8.5% were depressed in the 2nd and 3rd trimesters respectively. The prevalence of antenatal depression for the entire pregnancy period was reported at 18.4%. However, echoing the conclusions of the first meta-analysis, Gavin and colleagues concluded that due to many methodological limitations inherent in the existing literature, much ‘uncertainty’ surrounds the true prevalence of antenatal depression.

2.3.3. Methodological Limitations in the Antenatal Depression Literature

Whilst providing important information, there are many caveats to the results of both meta-analyses. Firstly, the confidence intervals for the prevalence data were often wide, largely due to the small number of studies pooled together to derive the statistics. For example, the first trimester rates produced by Bennett and co authors were only based on 5 studies. Similarly, the trimester estimates reported by Gavin and colleagues were derived from a minimum of 2 and a maximum of 5 studies. Secondly, some of the investigations included in both meta-analyses excluded women with a recent history of psychiatric disorder, while others excluded women of low socio-

economic status: both known risk factors for antenatal depression (Nonacs & Cohen, 2003; Kumar & Robson, 1984; Marcus et al, 2003).

Thus, the exclusion of these two groups of women would ultimately produce a downward bias in the pooled prevalence estimates. Indeed, when Bennett and co-authors repeated their analyses on studies of women of low socio-economic status only, the estimates for the 2nd and 3rd trimesters were 47% and 39% for questionnaire assessments, and 28% and 25% for diagnostic interview studies. Thirdly, many studies included in both meta-analyses were based on small samples (e.g. Areias et al, 1996, N= 54), and such samples were often unrepresentative of the population (Gavin et al, 2005). Thus, both groups of researchers advocated the need for further research into the risk factors, duration, and course of antenatal depression, especially among minority groups (Bennett et al, 2004; Gavin et al, 2005).

2.3.4. Antenatal Depression: Outcomes for Children

As stated previously, a body of evidence linking postnatal depression to adverse child outcomes has accumulated. Recently, researchers have questioned whether the apparent effects of PND could be accounted for by disturbances in maternal mood during pregnancy. Depressive and anxiety symptoms during gestation have been shown to be associated with sub-optimal infant outcomes on the Brazelton Neonatal Behaviour Assessment Scale (Field et al, 2004), the mental and motor indices of the Bayley Scales of Infant Development (Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2003) and parental and observers' ratings of an infant's emotional state (Davis, Snidman, Wadhwa, Glynn, Schetter & Sandman, 2004; Huizink, Robles de Medina, Mulder, Visser, Buitelaar, 2002). Importantly, associations between antenatal mood and infant outcome remained significant after

postnatal anxiety and depressive symptoms were accounted for (Davis et al, 2004; Huizink et al, 2002; Huizink et al, 2003).

Childhood follow-up studies of offspring exposed to high levels of anxiety symptoms in pregnancy have produced concordant findings. Studies derived from the Avon Longitudinal Study of Parents and Children (ALSPAC) find high levels of antenatal anxiety to be associated with behavioural and emotional disturbances in 4 and 6 year old children (O'Connor et al, 2002; O'Connor, Heron, Golding & Glover and the ALSPAC team 2003). Of significance, anxiety symptoms in pregnancy and depressive symptoms postpartum have been shown to represent separate risks for children's behavioural and emotional development, with both sources of influence being found to operate in an additive manner (O'Connor et al, 2002). Similarly, other prospective longitudinal designs have found associations between high levels of antenatal anxiety and children's ADHD symptoms, externalising problems, anxiety symptoms, and objective measures of impulsivity (Van den Bergh & Marcoen, 2004; Van den Bergh, Mennes, Oosterlaan, Stevens, Stiers, Marcoen, & Lagae, 2005). Again, the findings of Van den Bergh and co-authors remained significant after the influence of postnatal anxiety symptoms were taken into account.

The cause of these antenatal mood effects is yet to be determined, but likely mechanisms include foetal exposure to the maternal stress hormone cortisol, and placental insufficiency (Barker, 1998; Field, Diego, Hernandez, Gil, & Vera, 2005; Gitau, Cameron, Fisk, & Glover, 1998; O'Keane, 2006). This pre-programming 'foetal origins hypothesis' is supported by findings in the animal literature. For example, a number of studies have found that alterations to the maternal prenatal hypothalamic—pituitary—adrenal (HPA) axis affect the functioning and structure of the brain in prenatally stressed rats (Fameli, Kitraki, & Sylianopolou, 1994; Henry,

Kabbaj, Simon, Moal, & Maccari, 1994; Welberg & Seckl, 2001). Whilst the human literature is in its infancy, evidence consistent with the ‘foetal origins hypothesis’ is accumulating. For example, mothers with high depressive symptoms in pregnancy have higher cortisol levels, and infants exposed to elevated cortisol levels in utero have similarly high cortisol levels post partum (Field et al, 2004; Lundy et al, 1999). Thus, biological mechanisms have been highlighted as a determinant of adverse child outcomes in the context of antenatal depression.

2.4. Limitations of the Antenatal and Postnatal Psychopathology Literature: The Exclusion of Young Mothers

A major source of bias inherent in this literature, and one that is illustrated clearly in both antenatal depression meta-analyses is the omission of studies that have a focus on young mothers (Bennett et al, 2004; Gavin et al, 2005). Neither meta-analysis study justified the exclusion of this population from their analyses, though one can hypothesize that the authors assumed that young mothers would be more likely to suffer from depression during the pregnancy period and as such, did not want to ‘upward bias’ their prevalence estimates. This may not be the only basis for exclusion however, as individual studies in the antenatal and postnatal depression literatures often cite ‘medical complications’ as the reason for excluding mothers under 18 from their sample (e.g. Hobfoll et al, 1995). Evidently, the omission of this age group from such analyses renders it difficult to decipher whether or not young mothers are at a heightened risk of psychopathology in the perinatal period. What is more, the exclusion of this segment of the population from much of the literature can only add to the uncertainty surrounding the true prevalence of perinatal psychopathology. Thus, the discussion will now turn to addressing this gap in the literature.

2.5. Studies of Psychopathology among Young Mothers: A Summary of the Existing Literature

A thorough review of the literature on early parenthood and maternal psychopathology has been conducted and relevant studies are summarised in Table 2.1. Studies were deemed to be relevant if they reported the prevalence of depression among young mothers². As is the case with the adult literature, rather than reporting rates of clinically significant disorder, the vast majority of studies have focused on the prevalence of depressive symptoms. If studies assessed other forms of psychopathology as well as depression (e.g. conduct and anxiety disorders), then this fact is noted in Table 2.1. During the literature search, no study that focused exclusively on anxiety symptoms or disorder among young mothers was identified. Likewise, no study was identified that focused exclusively on the prevalence of disruptive behaviour disorders in samples of young mothers. Nonetheless, it should be noted that conduct problems in childhood and adolescence significantly predict a teenage birth (Bardone et al, 1996; Kovacs, Krol & Voti, 1994; Miller-Johnson et al, 1999; Woodward & Fergusson, 1999) and of the three known studies that assessed the life-time prevalence of conduct disorder in young mothers, estimates range between 33% and 43% (Cassidy et al, 1996; Jaffee, 2002; Romano et al, 2006).

² To ensure that a comprehensive review was conducted, studies that assessed the mother's mental state but did not report prevalence data were included in the tables.

Table 2.1. Studies of the Prevalence of Psychopathology (primarily depression) in Samples of Young Mothers at Various Points across the Life Course

Reference	Design & Assessments	Measures	Parity	Sample/Comparison Group/Age	Results
Barth et al (1983)	Cross-sectional; mothers all at different stages of parenthood	BDI No cut-score	2	Young pregnant mothers (N =62); parenting mothers (N=63); non-mothers (N=60)	Pregnant mothers had higher depression scores than non-mothers.
Colletta (1983)	Cross-sectional; assessed depression between 1-3 years PP.	CES-D ≥ 16	2	Teenage mothers (N = 75; 15-19 yrs). No comparison group.	59% of mothers above the cut-score. Higher rates in the 15-17 age group.
McGee et al (1983)	Cross-sectional; assessed mothers when children were aged 9.	Malaise	2	Cohort study (N = 899; \bar{X} = 34.5 yrs). Analysed characteristics of the depressed group.	8% of the sample were currently depressed. Mothers ≤20 more likely to be depressed.
Reis (1987)	Cross-sectional; mothers all at different stages of parenthood	CES-D ≥ 16	2	Young teen mothers (N = 100, ≤16 yrs); older teen mothers (N = 278, 17–19yrs) & adult mothers (N = 276, ≥ 20 yrs)	67% of young teen mothers; 53% of older teen mothers; and 35% of adult mothers scored above the cut-score for depression.
Beardslee et al (1988)	Cross-sectional; 3-6 months PP. Life-time prevalence and incidence of depression.	SADS Interview	2	Young mothers (N = 18; 18-21 yrs) who had all given birth as teenagers. No comparison group	Lifetime prevalence of 44%. Incidence of 33%. Majority of episodes had an onset in pregnancy.
Troutman & Cutrona (1990)	Longitudinal; 3 rd trimester of pregnancy & 6 & 52 weeks PP	SADS Interview	1	Childbearing teens (N=128; 14-18 yrs) vs. Non-Childbearing Friends (N=114)	No diagnostic differences at each assessment. 16% AND; 26% & 20% depressed at 6 & 52 weeks PP. Childbearing teens reported significantly more symptoms.
Leadbeater & Linares (1992)	Longitudinal; assessed depression at 1, 6, 12, & 28-36, months PP.	BDI ≥ 16	2	Childbearing teens (N = 89-120; 13-19 yrs). Puerto Rican vs. Black mothers.	No differences between ethnic groups. 31.4%, 31.4%, 22.2% & 18.8% above the cut-score at 1, 6, 12 & 28 months PP.
Prodromidis et al (1994)	Cross-sectional/case control 1 visit at 1-3 days PP	BDI ≥ 13	2	Young mothers (N=154; 14-21 yrs), no comparison group	Depressed mothers experience more psychosocial stress. Prevalence not reported.
Barnet et al (1996)	Longitudinal; 3 rd trimester of pregnancy & 2 & 4 months PP	CES-D ≥ 21	2	Teenage mothers (N = 104; 12-18yrs), no comparison group	42%, 36% & 32% above the cut-score for depression in pregnancy, 2 & 4 months PP.

Reference	Design & Assessments	Measures	Parity	Sample/Comparison Group/Age	Results
Horwitz et al (1996)	Cross-sectional; lifetime prevalence of depression assessed 20 years after the 1 st birth.	DIS Interview	2	Teenage mothers (N= 121; 13-18 yrs) at 1 st birth vs. adult mothers (N=30; 20+ yrs)	Teenage mothers 2 times more likely than older mothers (p<.10) to have ever had depression (11% vs. 5%).
Cassidy al (1996)	Cross-sectional; lifetime prevalence of depression & CD.	DIS & EPDS	2	Young mothers (N = 21; 15-20 yrs at the assessment. No comparison group.	33% had CD. 24% had depression.
Howard et al (1997)	Cross-sectional; 3 months PP	CES-D No cut-score	1	Teenage mothers (N = 48; 14-19yrs). Comparisons between races	No significant differences in depression scores for black & white mothers
Maughan et al (1997)	Cross-sectional; assessed affective symptoms at age 36.	PSE Top 10%	2	Teenage (N = 338; ≤19yrs) vs. older mums (N = 2106; 20+yrs)	No significant differences. 13% of teen & 9% of older mothers above cut-score.
Maughan et al (1997)	Cross-sectional; assessed affective symptoms at age 33 in a 2 nd sample born 10 yrs later.	Malaise Top 10%	2	Teenage mothers (N = 347; ≤19yrs) vs. older mothers (N = 2192; 20+yrs)	Teenage mothers significantly more likely than older mothers to score above the cut-score (18.7% vs. 7.7%).
Caldwell et al (1998)	Cross-sectional; 3 months PP	CES-D No cut-score	1	Teenage mothers (N=83; ≤19). Comparisons between races	No significant differences in depression scores for black & white mothers
Deal & Holt (1998)	Cross-sectional survey at a mean of 17 months PP	CES-D ≥ 16	1	Teenage mothers (N=926;15-19 yrs) vs. Older mothers (N=870; 25-34 yrs)	Teenage mothers twice as likely to be depressed (39% vs. 17%). Differences greater for black & multiparous mothers
Hudson et al (2000)	Cross sectional assessment at 3 months PP	CES-D ≥ 16	1	Childbearing teens (N=21; 15-19 yrs) no comparison group	53% scored above the cut-off score. Depression negatively related to social support
Stevens-Simon et al (2000)	Cross-sectional assessment at 6-12 months PP	CES-D ≥ 16	2	Teenage mothers (N=212; 13-19 yrs). Late vs. early contraceptive injection groups were compared	36% of the sample scored above the cut-score. Late contraceptive injection users had the highest depression rates.

Reference	Design & Assessments	Measures	Parity	Sample/Comparison Group/Age	Results
Moore & Flor-sheim (2001)	Cross-sectional assessment in early pregnancy. Life-time prevalence of disorder	DICA Interview	1	Expectant teenage couples (N=31; ≤19 yrs) vs. Non-expectant couples (N=31; ≤19 yrs)	Expectant males but not expectant females more likely to have internalising & externalising disorders than non-expectant group.
Black et al (2002)	Cross-sectional assessment when children were 4-5 years	CES-D ≥ 16	2	Teenage mothers (N=194; ≤19). No comparison group.	32% of the mothers scored above the cut-score for depression.
Jaffee (2002)	Cross-sectional; assessment of anxiety and depression symptoms at age 26. 1 year period.	DIS Interview	2	Childbearing teens (N=36; ≤19 yrs), and early twenties mothers (N=88; 20-26 yrs) vs. non-mothers (N=356).	No significant between group differences on the depression scale. Early twenties, but Not teenage mothers had higher anxiety.
Kalil & Kunz (2002)	Cross sectional assessment of depression at 12 years PP.	CES-D No cut-score	2	Childbearing teens (N=149; ≤19 yrs) vs. older mothers (N=440; 20+ yrs) & non-mothers (N=441)	Unmarried, but not married, teenage mothers had higher mean scores than married, but not unmarried adult mothers
Quinlivian (2003)	Cross-sectional in pregnancy; gestational age not reported	GHQ-28 No cut-score	1	Teenage mothers (N = 50; ≤19 yrs) vs. older mothers (N = 50; 20+).	Teenage mothers had significantly higher depression, anxiety & total scale scores. The % above the cut-score not reported
Birkeland et al (2005)	Cross-sectional between 3 & 12 months PP	EPDS ≥ 13	1	Teenage mothers (N=149; 15-19yrs); no comparison group	29% of teenage mothers scored above the cut-score for depression.
Logsdon et al (2005)	Intervention; assessed depression in 3 rd trimester & 6 weeks PP	CES-D ≥ 16	2	Young mothers (N = 109; 13-18 yrs) Intervention vs. Non-intervention group	Symptom scores higher in pregnancy than PP. 28% above cut-off PP. Did not report % above cut-off in pregnancy.
Rich-Edwards et al (2005)	Longitudinal; 3 rd trimester of pregnancy & at 6 months PP	EPDS ≥ 13	2	Young mothers (N=74; <23 yrs) vs. mothers aged 23-29 (N=376) and mothers aged >30 years	Younger mothers more depressed at each assessment. For mothers <23yrs, 23% defined AND & 22% defined PND.
Shanok et al (2005)	Cross-sectional; 1 assessment, either in pregnancy or PP	BDI ≥ 8	2	Young mothers (N = 40; 13–18 yrs); no comparison group.	56% scored above the cut-off score for depression.

Reference	Design & Assessments	Measures	Parity	Sample/Comparison Group/Age	Results
Hand et al (2006)	Cross-sectional; 5 days PP	PSI No cut-score	2	Teenage mothers (15-19 yrs) vs. adult mothers (≥ 20 yrs). Total N = 52	Adult mothers had significantly higher mean depression scores.
Romano et al (2006)	Cross-sectional; assessed the lifetime prevalence of MDD & CD in pregnant mothers	DIS Interview	2	Young mothers (N = 252; 14-22 yrs); no comparison group	High co-morbidity between MDD & CD. 33.3% had at least 1 episode of MDD in their lifetime. 43.3% had CD.
Schmidt et al (2006)	Longitudinal; assessed depression at 3, 12, 24, & 28 months PP	BDI ≥ 8	2	Teenage mothers (N = 623; 13-18 yrs). Comparisons between White, Black & Mexican American mothers.	57% of mothers above the cut-score at 1+ assessment. % above the cut-score highest PP (37%). Black mothers had lowest rates.
Caputo & Bordin (2007)	Cross-sectional; assessment at some point in the pregnancy	YSR ≥ 64	1	Teenage mothers (N = 207; 13-17yrs) vs. non-pregnant teens (N = 308; 13-17yrs)	Pregnant group had significantly higher anxiety & depression scores (24 vs.15%). Non-mothers higher delinquency scores.
Figueiredo et al (2007)	Longitudinal; 3 rd trimester of pregnancy & 2-3 months PP	EPDS ≥ 13	2	Young mothers (N = 54; ≤ 18 yrs) vs. adult mothers (N = 54; 19-40 yrs)	Young mothers significantly more depression than older mothers in pregnancy (26% vs.11%) and PP (26% vs.9%).
Secco et al (2007)	Cross-sectional assessment at 4 weeks PP.	BDI ≥ 10	2	Young mothers (N = 69; 15-19 yrs); no comparison group	43.5% scored above the cut-off score for depression.
Shanok & Miller (2007)	Cross-sectional assessment of pregnant & parenting teenagers	BDI ≥ 10	1	Teenage mothers (N=80; 13-19 yrs); no comparison group	44% had mild to severe depressive symptoms.
Boden et al (2007)	Cross-sectional; assessed prevalence between 21-25 yrs of MDD, anxiety & drug abuse	CIDI Interview	2	Teenage mothers (N=22; ≤ 18 yrs) vs. young (N=18-21 yrs) & non-early mothers (N = 429; 21+ yrs).	54.6%, 28.1% & 25.2% of teen, young, & non-early mums had MDD. 45.5%, 29.7%, & 21.7% an had anxiety disorder.

PP = Postpartum; AND = Antenatal Depression; PND = Postnatal Depression; MDD = Major Depressive Disorder; CD = Conduct Disorder; Parity: 1 = Primiparous; 2 = Multiparous; EPDS = Edinburgh Postnatal Depression Scale; BDI = Beck Depression Inventory; CES-D = Centre for Epidemiological Studies of Depression Instrument; YSR = Youth Self Report Questionnaire; PSI = Psychiatric Symptom Index; Malaise Inventory; GHQ-28 = General Health Questionnaire-28 item; PSE = Present State Examination; SADS = Schedule for Affective Disorders and Schizophrenia; DIS = Diagnostic Interview Schedule; DICA = Diagnostic Interview for Children and Adolescents; CIDI = Composite International Diagnostic Interview.

2.6. Studies that Assessed Depression Outside of the Perinatal Period: The Young Mother Literature

During the literature search, 35 studies that assessed the mental state of young mothers were identified. Of these, only eight used an in-depth diagnostic interview to assess depression. The remaining 27 studies used one of eight different questionnaire measures to identify women who are likely to be suffering from depression (see Table 2.1). Of the 35 studies that were identified, 8 did not report prevalence data. Three of these studies sought to identify the correlates of depressive symptoms among young mothers with particular reference to differences between ethnic groups. Two of the studies that did not report prevalence data compared teenage mothers with young women who were not yet mothers; neither study found significant between group differences (Jaffee, 2002; Moore & Florsheim, 2001). However, pertinent to the current line of research, mothers who entered parenthood in their early twenties reported more symptoms of anxiety than non-mothers (Jaffee, 2002).

Of the remaining 3 studies that did not report prevalence data, mean symptom score comparisons between teenage (aged 19 and under) and older mothers (aged 20 and over) were conducted. Two of these three studies found teenage mothers to report more symptoms of depression than older mothers (Barth et al, 1983; Kalil & Kunz, 2002). Conversely, one study found older mothers to have higher symptom scores than teenage mothers (Hand et al, 2006). However, the findings of this latter study are hampered by two major weaknesses. Firstly, the sample size was comparatively small. Secondly, some of the teenage mothers in this sample were mis-classified as older mothers as the authors used the women's current age, as opposed to their age at entry to parenthood, when constructing their groups (Hand et al, 2006).

Of the remaining 27 studies that did report prevalence data, three assessed the lifetime prevalence of depression and eight reported the rates of depression for a

specified time period: typically, a 1-2 week reporting period was used. These 11 studies all varied in the time point in the mother's life course when the assessment took place. All of these studies employed a cross-sectional design, assessing the mother's mental state outside of the perinatal period. Whilst the majority of these studies conducted one-off assessments of the mother's mental state at some point during her offspring's childhood, others assessed the prevalence of depression when the mothers were in their 3rd, 4th, or 5th decade of life. For the three studies that assessed the lifetime prevalence of depression, estimates range between 11% and 33.3% (Horwitz et al, 1996; Romano et al, 2003). Of the studies that reported the point prevalence of depression, estimates range between 13% and 59%. Variability in the lifetime and point prevalence estimates of these studies is attributable to differences in the measures used, the cut-score of choice, the timing of the assessment and the sampling strategy (these issues and their implications are discussed in depth in the subsequent methodological limitations section).

2.6.1. Studies that have Assessed Depression during the Perinatal Period

As is the case with the adult literature, the majority of studies that have assessed the mental state of young mothers during the perinatal period have focused on the months following childbirth. Thirteen studies assessed the mother's mental state during the postnatal period (see Table 2.1). Five of these 13 studies were longitudinal, assessing the prevalence of depression in the antenatal and postnatal period. Six of the postnatal studies were cross-sectional and a further two employed a longitudinal design. However, unlike the other 5 longitudinal studies, the latter two began in the postnatal, as opposed to the antenatal period. Both of these studies assessed the mother's mental state within the first 3 months of childbirth, conducting three further assessments at 6 to 12 monthly intervals over the following 2-3 years

(Leadbeater & Linares, 1992; Schmidt et al, 2006). Both studies documented a peak in depressive symptoms at one and/or 3 months postpartum, noting a significant decline in symptom severity over the course of subsequent assessments (Leadbeater & Linares, 1992; Schmidt et al, 2006).

Of the studies that have assessed the mental state of young mothers in the months following childbirth, 11 used questionnaires and only 2 used a diagnostic interview. For the questionnaire studies, prevalence estimates of PND among teenage mothers lie between 22% and 53% (Rich-Edwards et al, 2005; Hudson, 2000). Typically, it is estimated that 1 in 3 adolescent mothers are depressed postpartum (see Table 2.1). For the interview studies, 33% and 26% of adolescent mothers have been found to be suffering from clinically significant depression in the first 3 months following childbirth (Beardslee et al, 1988; Troutman & Cutrona, 1990). Thus, in reference to the broader literature (see O'Hara, 1997), adolescent mothers are approximately twice as likely as adult mothers to be depressed post partum. In general, the postnatal studies did not include a comparison group (see Table 2.1). Instead, researchers tended to recruit mothers aged 18 to 19 and younger into their sample and usually, these young women were enrolled in a psycho-educational intervention programme.

However, two of the postpartum studies referenced in Table 2.1 did compare the rates of depressive symptoms in young and older mothers. Rich-Edwards and colleagues (2005) compared mothers aged 23 and under with mothers aged 23-29 and mothers aged 30 and over. Relative to both older mother groups, twice as many young mothers scored above the cut-score for depression on the EPDS questionnaire (Rich-Edwards et al, 2005). Similarly, Figueiredo and colleagues (2007) found that almost three times as many teen as opposed to older age mothers scored above the cut-score

on the EPDS. Additionally, one study compared teenage mothers with non-parenting teens recruited from the same community (Troutman & Cutrona, 1990). Here, significant differences in the rates of clinically significant depression between parenting and non-parenting teens were not found. However, in comparison to the parenting teens, the teenage mothers reported significantly more depressive symptoms.

As mentioned previously, far less attention has been paid to depression occurring in the antenatal as opposed to the postnatal period. This is surprising considering that reports published almost two decades ago documented higher rates of depressive symptoms among young mothers during the antenatal relative to the postnatal period (Troutman & Cutrona, 1990). Yet, in their paper, Troutman and Cutrona focus exclusively on their postnatal findings, making little reference to their pregnancy data: a peculiarity common to the other studies in this literature (e.g. Logsdon et al, 2005; Rich-Edwards et al, 2005). The neglect of the study of antenatal psychopathology among young mothers is further illustrated by the limited number of papers published on this topic. Only 7 of the 35 identified studies assessed the mother's mental state during pregnancy (see Table 2.1). Overall, the reported prevalence of antenatal depression among young mothers lies between 16% and 42%, with the one diagnostic interview study reporting the lowest rate. Typically however, it is estimated that 1 in 4 adolescent mothers suffer from depression during pregnancy (see Table 2.1).

Of the seven antenatal studies, only one used a diagnostic interview to assess depression. Two of these studies are cross-sectional, and five are longitudinal, conducting 1 to 2 follow-up assessments during the first postpartum year. All of these studies report higher rates of depressive symptoms during pregnancy than in the post

partum, yet due to their focus on PND, the authors of these studies tend not to discuss their antenatal findings. Indeed, the majority of these studies fail even to report the proportion of participants likely to be suffering from depression during the antenatal period. In general, all of the antenatal studies that compared young and older mothers find significantly higher rates of depression in the young mother group. A further two studies compared pregnant teenagers with non-pregnant/parenting teenagers. Both of these studies report significantly more depressive symptoms in the child bearing group (Caputo & Bordin, 2007; Troutman & Cutrona, 1990); however, Troutman and Cutrona did not find significant between group differences in the rates of clinically significant disorder.

2.7. Limitations and Methodological Problems in the Literature on Young Mothers and Psychopathology

The literature on early parenthood and maternal psychopathology is fraught with methodological limitations. These include sampling problems, measurement inconsistencies, differences in the definition of a young mother, and variability in the construction of the comparison group. In terms of sampling problems, many of the studies included in Table 2.1 recruited their sample from specialised intervention programmes. This recruitment strategy brings the representativeness of the sample into question as it is possible that these young women are at lower risk of depression because of the additional support that they receive. For example, women enrolled in an intervention programme may have higher absolute levels of well being because of the increased social contact, formal and informal counselling opportunities, and the pre-and-post-natal care that they receive. Conversely, it is also possible that women enrolled in specialised programmes are at elevated risk. For example, one can

speculate that such services are offered to those young women deemed to be most in need.

A further sampling-related concern that plagues this literature is the fact that the vast majority of studies included in Table 2.1 were conducted in the USA. Added to this, many of these studies recruited ethnic minority samples. Thus, given that the context of early motherhood varies by country, one can question how well these findings generalise to young mothers from other industrialised nations. Finally, adding to the foregoing sampling limitations is the reality that many of the longitudinal studies cited in Table 2.1 suffered high attrition rates. For example, one of the more impressive longitudinal studies included in Table 2.1 (Schmidt et al, 2006³) suffered a 40% drop out rate over a 3 year period. What is more, those women who dropped out of the study were more likely to be depressed at time 1 (Schmidt et al, 2006). Thus, when one considers the problems of selective attrition and deficient sampling strategies, it is difficult to know how representative many of the samples included in Table 2.1 are of the population from which they were drawn; a fact that hampers the generalisability of this research literature.

Further methodological shortcomings, clearly evident in Table 2.1, are the issues of construct validity and measurement inconsistencies. The majority of referenced papers used one of eight different questionnaire measures to identify mothers likely to be suffering from antenatal and/or postnatal depression. Not only do these questionnaires differ in content, but only three of them (the BDI, the EPDS and the GHQ) have been validated in pregnant and postpartum populations (Holcomb et al, 1996; Kumar & Robson, 1984; Murray & Cox, 1990). This issue is of grave importance as the somatic symptoms of depression overlap with the ‘symptoms’ of

³ The studies highlighted here and those selected throughout the discussion of methodological issues are chosen as examples as they represent some of the more prominent papers in terms of publication prestige. They are by no means more flawed than the countless number of other studies not cited.

pregnancy e.g. insomnia/hypersomnia, appetite changes, weight gain, and fatigue. Thus, in these questionnaire studies, somatic symptoms that are often part and parcel of the pregnancy and postpartum experience are recorded as present, regardless of whether they occur in the context of depressed mood. The inevitable inflation of symptom scores that this creates could therefore account for the higher prevalence rates of depression that are found in questionnaire studies. It is only through in-depth interviews that the context and nature of perinatal somatic symptoms can be understood—and, differentiated from those of depression.

Additional methodological inconsistencies can be seen in Table 2.1. For example, even when different studies have used the same questionnaire scale to assess depression, they often go on to use different cut-scores to identify probable cases. The uncertainty and confusion caused by these decisions (e.g. prevalence rates that vary by the threshold used for depression) seem inexcusable as each measure has a pre-specified cut-score that has been derived from a series of validity and reliability studies. Finally, a further inconsistency central to this literature is the fact that different studies use different ages to define their young or teenage mother groups (see Table 2.1). Moreover, not all studies use age at first birth as the categorisation criterion. For example, some authors use the mother's age at entry into the study to define a young mother instead of her age when her first child was born. This strategy then complicates and dilutes the findings as women who gave birth as teenagers are then classified as older mothers (see Hand et al, 2006). Taken together, the methodological limitations discussed in this section not only complicate comparisons between studies, but they reduce the applicability of the findings to clinical settings.

2.8. Summary

In general, young motherhood is associated with an elevated risk of adverse outcomes for mothers and children. In particular, the literature suggests that relative to older mothers, teenage mothers demonstrate higher rates of psychopathology throughout the perinatal period. What is more, this vulnerability to mental illness during the antenatal and postnatal months is observed amongst primiparous and multiparous women who began childbearing during the teenage years. Thus, women who entered parenthood during their adolescent years, but who are not necessarily teenagers at the time of subsequent pregnancy, have been found to be at risk of psychopathology during the antenatal and postnatal months.

During the months following childbirth, approximately 1 in 3 adolescent mothers are reported to be suffering from depression. For the pregnancy period, the limited number of available studies implies that 1 in 4 adolescent mothers experience depression. However, very few studies have assessed the mental state of young mothers during the antenatal months. For those that have, brief questionnaire assessments are the norm; and cross-sectional studies dominate this literature. Thus, due to the focus on postnatal depression, and upon a reliance on questionnaire measures, far less is known about the prevalence and nature of depression among young mothers during the antenatal period. As such, the prevalence estimates derived from the preceding review should be viewed with caution.

2.9. Aims of the Thesis

2.9.1. Aim 1: To Examine the Longitudinal Course of the Mental Health Problems Experienced by Women Who Entered Parenthood at Different Ages

Whilst being informative, the literature on young motherhood and psychopathology in the perinatal period is limited by the fact that the majority of studies have begun after childbirth, employed a cross-sectional design, used a solitary questionnaire assessment of the mothers level of psychological functioning, or failed to recruit a comparison group. As a consequence, detailed information on the onset, course, and severity of the mothers' episodes of illness—which would inform the timing and nature of the intervention, is yet to be provided. Thus, the aim of the first empirical study in this thesis is to examine the prevalence, course and severity of the mental health problems experienced by a community sample of women who were studied from pregnancy and throughout the first 11 years of the study child's life. In order to build upon and further past research, the first aim of this thesis will be addressed within the context of a prospective longitudinal design where diagnostic interview assessments of the mother's mental state have been made repeatedly over a 12 year period.

Empirical study 1 (chapter 3) will compare and contrast the psychological functioning of adolescent mothers with that of older mothers. In addition, the psychological functioning of young mothers in their early twenties will also be contrasted with that of older mothers. As discussed in chapter 1, over the last 4 decades the industrialised nations have seen a dramatic shift toward delayed parenthood, and most women now defer childbearing until their late 20s and early 30s. As a consequence of this demographic shift, the question is raised as to whether

women who enter into parenthood in their early twenties are also at risk of the adverse outcomes commonly experienced by adolescent mothers. Given their substantially off-time-early entry to parenthood relative to the norm, early twenties mothers are expected to be at comparable levels of risk for mental health problems as teenage mothers.

2.9.2. Aim 2: To Examine Whether Any Increased Risk of Cognitive, Behavioural and Emotional Problems Shown by the Children of Young Mothers Could be Explained by Exposure to Their Mothers Mental Health Problems

Throughout development, the offspring of young mothers show developmental deficits and patterns of maladjustment across a number of domains of functioning. However, few studies follow-up children born to young mothers into late childhood and adolescence, especially in a UK context. Thus, the second empirical study included in this thesis (chapter 4) will examine the cognitive, behavioural and emotional development of a community sample of children who were born in the UK and who are approaching their adolescent years. In addition, in terms of decreasing the risk adolescent parenthood poses to children's development, reducing the mothers' level of psychological distress has been highlighted as a point of intervention (Berrington et al, 2005). However, to date, the early parenthood literature has paid little attention to the broader literature on maternal psychopathology and child development—where the importance of the timing of the child's initial exposure to the mother's depressive illness is well documented. Thus, empirical study 2 will test whether any increased risk of cognitive, behavioural or emotional problems shown by the offspring of young mothers is accounted for by their exposure to their mother's mental health problems during the antenatal and postnatal months, and/or at

later points in development. Again, particular attention is given in study 2 to the development of children born to women who entered parenthood in their early twenties.

2.9.3. Aim 3: To Identify the Predictors of Antenatal Psychopathology among a New Sample of Contemporary Young Mothers

In line with the focus of the thesis, the third empirical study (chapter 5) will examine the psychological functioning of a second sample of women who are pregnant with their first child. Building on the findings of the previous studies, analyses on the second, more contemporary sample of young mothers will seek to identify which young women are most likely to suffer mental problems during the antenatal period. The third study in this thesis extends past research by considering the individual as well as the demographic predictors of antenatal psychopathology among a sample of first-time mothers. Paying attention to measurement, this study also employs a diagnostic interview assessment of the mother's mental state. Again, as well as examining the psychological functioning of adolescent and older mothers, particular attention is given to the mental health outcomes of mothers in the early twenties.

Chapter 3

EMPIRICAL STUDY 1

An Examination of the Clinically Significant Mental Health Problems Experienced by Women Who Became Mothers at Young Ages: An 11-year Longitudinal Study

3.1. Introduction

The review of the literature presented in chapters 1 has shown that entry into motherhood during the adolescent years has adverse educational, social, and economic consequences for the mother and the child; however, far less is known about the effect of early childbearing on the mother's mental health (see chapter 2). Where studies of the mother's mental health have been conducted, researchers have tended to use brief questionnaire assessments of the mother's psychological functioning at different time points; and most studies are cross-sectional (e.g. Maughan & Lindelow, 1997; Secco et al, 2007). As a consequence, little is known about the prevalence and longitudinal course of clinically significant mental problems in the context of young motherhood. In addition, due to a focus on adolescent parenthood, far less is known about the mental health problems experienced by young mothers whose entry into parenthood is after the adolescent years, but before the normative childbearing age. Thus, the aim of the current chapter is to examine the prevalence, severity, and longitudinal course of the mental problems experienced by mothers who entered parenthood as adolescent and during their early twenties.

Outside of the context of young motherhood, much research into parenthood and psychopathology has focused on the months following childbirth (Cooper et al, 2007; O'Hara et al, 1990; Murray & Cooper, 1997), and postnatal depression has been found to be associated with problems for the mother, the marital relationship, and children's development (Hay & Kumar, 1995; Murray & Cooper, 1997; Pawlby et al, 2008; Robertson et al, 2004). As discussed in chapter 2, empirical findings on postnatal depression have had a noteworthy effect upon policy and practice in the UK, and this literature has led to the development of clinical guidelines to screen for and manage postnatal depression (e.g., National Institute for Clinical Guidelines, NICE, 2007; Scottish Intercollegiate Guidelines Network, SIGN, 2002). Health visitors and other members of the primary care team routinely screen for depression during the postnatal months, and intervention initiatives such as the Flying Start programme (Flying Start, 2007) and the Family Nurse Partnership (Olds et al, 2007) have policies that address the mother's emotional well being.

During the postnatal period, women who begin childbearing during their adolescent years have been found to report higher rates of depressive symptoms than older mothers and non-parenting teens (Barnet et al, 1996; Rich-Edwards et al, 2005; Troutman & Cutrona, 1990). Far less attention has been paid in both the young mother literature and in studies of adult mothers (see Keane, 2006) to the mother's mental state during pregnancy (see chapter 2). Assessments in pregnancy are important, as it is estimated that 1 in 2 women suffering from postnatal depression were depressed during the antenatal months (Gotlib et al, 1989; Figueiredo et al, 2007; Hobfoll et al, 1995). This relative neglect in the assessment of antenatal psychopathology among younger mothers is surprising when studies published one to two decades earlier had documented higher rates of depressive symptoms during

pregnancy than the postpartum (Barnet et al, 1996; Troutman & Cutrona, 1990).

Nonetheless, in the few studies that have assessed the mental state of young mothers during the antenatal, as well as the postnatal months, the focus has centred on the postpartum findings, and little credence was given to the antenatal data (see chapter 2).

As discussed in chapter 2, the detection of depression during pregnancy is of importance as recent research has consistently documented links between antenatal affective symptomatology and adverse child outcomes (e.g. Pawlby et al, 2008; O'Connor et al, 2002). What is more, the early detection of depression may accelerate treatment, and offer support to women who are vulnerable to further episodes of depressive illness during the childbearing years. However, due the exclusion of younger mothers from much of the literature on perinatal mental illness (see chapter 2), and due to the absence of longitudinal studies in the young mother literature that have begun in pregnancy, far less is known about the longitudinal course of the mental problems experienced by younger mothers. In particular, it is not known whether women who gave birth at younger ages are at elevated risk for depression during subsequent pregnancies.

Thus, in light of the above, the aim of the current study is to examine the prevalence of mental health problems during a focal pregnancy, and throughout that offspring's childhood by women who entered parenthood as teenagers and in their early twenties. In the current study of a community sample of antenatal patients (both primiparous and multiparous), the psychological functioning of both groups of young mothers will be contrasted with that of older mothers. To deepen our understanding of the mental health problems experienced by mothers who entered parenthood at younger ages, psychiatric interviews were conducted during the focal pregnancy, the

postnatal period, and throughout that child's first 11 years of life. Furthermore, the medical records of the participants were consulted during the antenatal and postnatal months in order to gain an insight into the women's help seeking behaviour and their experience of treatment. Enquiries were made about anxiety as well depressive disorders, and questionnaires were used to supplement the wealth of information generated from the diagnostic interviews and the medical notes.

3.2. Method

3.2.1. *The Participants*

The women studied here participated in the South London Child Development Study (SLCDS), a prospective longitudinal study of a birth cohort of children and their families. Between 1st January and 31st December 1986, women were recruited from antenatal clinics in two National Health Service (NHS) general medical practices in South London (Sharp, 1993). In the UK, 96% of the population is registered with the NHS (Hannaford, Smith, & Elliott, 2006). Only 0.5% of births in the UK take place in private hospitals (NHS Maternity Statistics, 2004/5). Therefore, virtually all pregnant women in the two geographical catchment areas were registered for antenatal care at these two NHS practices.

During the recruitment year, 252 consecutive women who presented for antenatal care entered the study. The children were born between July 1986 and August 1987. Of the 252 women who participated in the study and completed the first assessment, 202 (80%) gave birth to healthy infants and consented to further contact at the end of the first postnatal year. Of the women who dropped out of study, 34% (17/50) experienced a miscarriage, 4% (2/50) had an intrauterine death, 4% (2/50) had a termination, and 22% (11/50) had moved too far away from the area to be included

in the follow-up study. In 8% (4/50) of families the child died during infancy, in 1 family (2%) the child was under the care of social services and access was denied and 26% of families (13/50) refused to participate after the child's birth.

Of the 202 women available for follow-up, 176 (87%) agreed to participate and provided complete data throughout all stages of the study. Comparisons between the 176 participants in the current study and the 76 not included revealed no significant differences in the mother's age at first birth, social class, marital status, ethnicity, educational level, parity and previous history of affective disorder. However, mothers not included in the current sample were significantly more likely to be depressed during the first antenatal interview.

Characteristics of the sample are presented in Table 3.1. In many ways, the sample is representative of urban populations in the UK, where approximately 90% of the population live in urban areas (Office of National Statistics, 2003). In terms of family structure and the mother's marital status at the birth of the study child, the sample was almost identical to national norms (Office of National Statistics, 2000). However, compared to national data, the SLCDS had a higher proportion of working class families and families from ethnic minority groups (Office of National Statistics, 2000). Based on the 2001/2002 data collected throughout England, the deprivation scores of the two South London communities from which the sample was drawn ranked on the 6th and 11th percentiles, where a lower rank indicates greater deprivation. Nonetheless, in terms of the mother's age at childbirth and at first birth, the sample is in line with national norms. For 1986, the UK average age at childbirth for women was 27.0 years, whereas the mean age at first birth was 24.9 years (Social Trends, 2003). Characteristics of the SLCDS sample can be seen in Table 3.1.

Table 3.1: Characteristics of the Mothers and their Environment

	Maternal Age Group			Sample (N=176)
	≤19 (N=31)	20-22 (N=56)	23+ (N=89)	
Age at First Birth (First Time mothers)	18.5 (0.7)	20.9 (0.8)	27.4 (3.8)	24.8 (4.8)
Age at First Birth (All Women)	18.4 (0.8)	21.0 (0.8)	27.2 (3.6)	24.0 (4.6)
Age at Study Child's Birth	22.7 (4.8)	25.2 (4.3)	28.8 (4.5)	26.6 (5.1)
Multiparous (%)	61.3	71.4	38.2	52.8
White British Origin (%)	83.9	83.9	71.9	77.8
Married to Child's Father at Birth (%)	38.7	66.1	70.8	63.6
Single at Child's Birth (%)	16.1	7.1	1.1	5.7
No maternal qualifications (%)	32.3	39.3	20.2	28.4
Working Class (%)	93.5	92.9	80.9	86.9
Married to Child's Father at 11 (%)	19.4	30.4	67.4	47.2
Single at 11 (%)	25.8	30.4	11.2	19.9

3.2.2. Procedure

All phases of the study were approved by the Ethics Committee of the Institute of Psychiatry, King's College London. After complete description of the study, written informed consent was obtained from the participants. A multi-method, multi-informant design was adopted. Observational, interview, and questionnaire methods were used.

Pregnancy and the first postnatal year. All mothers were interviewed during the second trimester of pregnancy and during the first postnatal year and a battery of questionnaires was completed at these assessment points. The mother's mental health was assessed during these visits with the Clinical Interview Schedule (CIS; Goldberg, Cooper, Eastwood, Kedward, & Shepherd, 1970). Additionally, at the end of the third trimester of pregnancy (36 weeks gestation) and at 3 months postpartum, all mothers provided pregnancy, childbirth and mental health related information via postal

questionnaires. At these time points, an additional three quarters random sample of women was interviewed with the CIS (Goldberg et al, 1970). General practitioners who did not know the participants at the first assessment point conducted all of the antenatal and postnatal interviews. During all phases of data collection, socio-demographic and family relationship information was updated. In addition, research assistants collected mental health-related information from the medical notes and the health visitors' records at the end of the first postnatal year.

The children's 4th and 11th birthdays. The mothers were visited at home when the children were 4 and 11 years of age. Different research psychologists who were unaware of the information collected at the previous visits interviewed the mothers at the 4 and 11 year assessment. All researchers were trained at the Institute of Psychiatry and each held a Bachelors degree in Psychology. At each time point, socio-demographic, life history, and family relationship information current and retrospective to the last visit was collected. Likewise, maternal mental health was assessed concurrently and retrospectively to the last visit using the Schedule for Affective Disorders and Schizophrenia-Lifetime Version (SADS-L; Spitzer, Endicott & Robins, 1978).

3.2.3. Measures

Maternal childbearing age. Maternal age at the birth of the study child and at first birth was recorded in whole years. Based upon their age at first birth, mothers were classified into three, theoretically and socially, meaningful maternal age groups. The categorisation of participants into maternal age groups was based upon the existing literature, and upon national norms. The age groups are as follows: (1)

mothers aged 19 and under (*teenage mothers*); (2) mothers aged between 20 and 22 (*early twenties mothers*); and mothers aged 23 and over (*older mothers*).

The definition of a teenage mother i.e. 19 years and younger at the time of the woman's first live birth aligns with the vast majority of the literature (e.g. Berrington et al 2005; Jaffee et al, 2001; see also Table 2.1 Chapter 2). Furthermore, mothers aged 19 and under are the focus of many policy initiatives in the UK (e.g. Department of Health, 2007; Flying Start, 2007; Teenage Pregnancy Independent Advisory Group, 2008) whereby legislation and intervention programmes are targeted at mothers aged 19 and under; mothers aged 20 and over do not qualify for many of these specialised services and age 19 is generally used as the cut-off. The definition of an early twenties mother i.e. 20, 21 or 22 years old at the time of the woman's first live birth aligns with the time period in the life course defined as 'emerging adulthood' (Arnett 2000; see also Chapter 1). Furthermore, given that most policy initiatives are targeted at mothers aged 19 years and younger, a key focus of this thesis was to examine the psychosocial risks associated with a transition to parenthood in the early twenties given that this group of young mothers and their children do not receive targeted intervention programmes. The definition of an older mother i.e. 23 years and older at the time of the woman's first birth, aligns with the vast majority of the literature (e.g. Jaffee et al, 2001; Moffitt et al, 2002) except for the fact that mothers aged 20, 21, and 22 at the time of their first birth are often included in the older mother age group (see Table 2.1 Chapter 2).

Table 3.1 reports the average age of the women in the different age groups at the time of the study child's birth and at the time of their first birth. Women in the different maternal age groups were significantly different in terms of their age at first birth, $F(2, 173) = 176.52, p < .001$, and their age at the study child's birth $F(2, 173) =$

24.54, $p < .001$. Post hoc analyses revealed that the women in the teen mother age group were significantly younger than the women in the early twenties age group at the time of their first birth, $t(87) = -2.56, p = .001$, and at the time of the study child's birth, $t(87) = -2.52, p = .03$. Similarly, post hoc analyses revealed that the women in the teen mother age group were significantly younger than the women in the older mother age group at the time of their first birth, $t(120) = -8.83, p = .001$, and at the time of the study child's birth, $t(120) = -6.04, p = .001$. Finally, post hoc analyses also revealed that the mothers in the early twenties age group were significantly younger than the women in the older mother age group at the time of their first birth, $t(145) = -6.23, p = .001$, and at the time of the study child's birth, $t(120) = -3.52, p = .001$.

Mother's educational qualifications. Upon entry into the study, mothers were asked to report their educational attainment. Women were classified as having any educational qualification from CSE or 'O' level upwards, and having no examination passes.

Social background. Social class was determined using the Goldthorpe and Hope social grading of occupations (Goldthorpe & Hope, 1974). The highest ranked employment that the mother ever had at entry into the study was used to determine the mother's socioeconomic status. Mothers were classed as either working or middle class. Ethnicity was classified as either white British origin or other (see Table 1).

The mother's prior history of affective disorder. This measure was used as an index of the mother's history of affective disorder prior to the conception of the study child. Mothers were judged to have suffered from a mental health problem if they reported suffering from a depressive and/or anxiety disorder prior to the conception of

the study child and if they sought treatment from their GP and/or another mental health professional for their illness.

Antenatal affective disorder. A dichotomous variable was created that detailed whether or not the mother had met ICD-9 criteria for a clinically significant depressive disorder during pregnancy (World Health Organization, 1978). Likewise, a dichotomous variable was created to detail whether or not the mother had met ICD-9 criteria for an anxiety disorder. Diagnoses were based on the information collected when the mothers completed the Clinical Interview Schedule during the second and third trimesters of pregnancy (CIS: Goldberg et al, 1970). As part of their training on the CIS, the two general practitioners who conducted the interviews took part in a reliability analysis of 20 participants. The overall agreement between the 2 interviewers of the reported symptoms on the CIS, given as a weighted kappa coefficient, was .80.

The vast majority of women with an affective disorder were classified as having neurotic depression. Of the women with an affective disorder 74% (39/53) were classified with neurotic depression, 19% (10/53) were classified as having either a brief or a prolonged depressive reaction and 7% (4/53) were classified as having an anxiety state or an adjustment disorder with anxiety (ICD-9: World Health Organization, 1978). In addition, 8% (4/49) of the women with a depressive disorder had a comorbid anxiety diagnosis. However, it is important to note that the ICD-9 classification of neurotic depression states that along with depressed mood, anxiety is frequently present in this categorization and mixed states of anxiety and depression are classified as 'neurotic depression' (ICD-9: World Health Organization, 1978). Nonetheless, due to the insufficient number of women diagnosed with an antenatal

anxiety disorder⁴, a continuous measure of anxiety symptoms was created. Mothers completed the Leeds Anxiety Scale during the second and third trimesters of pregnancy (Snaith, Bridge, & Hamilton, 1971). The Leeds scale scores at each time point were averaged to provide an index of anxiety symptoms in pregnancy. The anxiety scale showed acceptable levels of internal consistency, $\alpha = .77$.

During the antenatal and postnatal period, and to avoid over-diagnosis, the somatic symptoms of affective disorder as assessed on the CIS were operationalised further. Because being pregnant and having a new baby are very often associated with extreme tiredness and appetite changes, the fatigue, appetite and sleep items were more specifically defined and when appropriate, 'down rated'. For example, in order for sleep loss to be defined as clinically significant, it had to occur for more than 2 hours on more than 3 nights. On the original version of the CIS, to be defined as clinically significant, sleep loss had to occur for at least 2 hours on 3 or less nights. Furthermore, for sleep loss to be coded during the postnatal period it had to occur outside of the context of feeding the baby.

*Affective disorder during the study child's infancy*⁵. Mothers were interviewed at 3 and 12 months postpartum with the CIS and diagnoses of depressive and anxiety disorders were made in reference to ICD-9. Again, diagnoses of neurotic depression were the most prevalent classification in the postnatal period although women were also diagnosed with a brief or a prolonged depressive reaction. At the 4 year interview, mothers reported on their mental state during the first postnatal year using the Schedule of Affective Disorders and Schizophrenia—lifetime version (SADS-L;

⁴ The distribution of antenatal anxiety disorders ($N = 8$) across the women in the different maternal age groups is as follows: 6.5% (2/31) of teenage mothers, 8.9% of early twenties mothers (5/56) and 1.1% of older mothers.

⁵ Only 7 women were diagnosed with an anxiety disorder during infancy and 6 of these women were also diagnosed with a depressive disorder during the same time period. Thus, further analyses focused upon depressive disorders.

Spitzer, Endicott, & Robins, 1978). Diagnoses of depressive and anxiety disorders on the SADS-L were made in reference to Research Diagnostic Criteria (RDC) by the lead psychiatrist on the team (R Kumar). Mothers were judged to have suffered from depression during infancy (between 0 and 1 years) if they met ICD-9 criteria for a depressive disorder at 3 and/or 12 months postpartum. Similarly, mothers were judged to have suffered from anxiety during infancy (between 0 and 1 years) if they met ICD-9 criteria for an anxiety disorder at 3 and/or 12 months postpartum. In the absence of the 3 and/or 12 month interview, the SADS-L report was used. Women who were classified as depressed during infancy were further categorized into those who had postnatal depression and those who had not. To align with the literature (e.g. O'Hara et al, 1990; Murray, 1992), mothers were deemed to have suffered from postnatal depression if their illness onset within the first 3 months of the child's life⁶.

Mental health-related information from the medical records. Due to the unique nature of the study, in that it was conducted entirely within the primary care setting, it was possible to access the mothers' medical records. In addition, the health visitor's files were also available for consultation. At the end of the first postnatal year, research assistants collected information on the number of mental health-related consultations for the pregnancy and infancy periods of the study. From the health visitor's records, the research assistants coded whether or not the mother had mentioned a mental health problem during her consultation. In addition, when going through the medical notes, the research assistants coded the nature of the mental health problem, whether psychotropic medication was prescribed, and whether a referral was made to a mental health professional.

⁶ One woman was hospitalized during the first postnatal year because she was suffering from a severe postnatal depression. Since we had independent corroboration from the hospital records of this woman's diagnosis, she was included in the present analyses and classified as having suffered from postnatal depression.

Affective disorder after the perinatal period. At the 4 and 11 year assessments, mothers were interviewed with the SADS-L about their current mental state and experience of symptoms retrospective to the last assessment point. Diagnoses in line with RDC criteria were made by the lead psychiatrist on the team (R Kumar). Two variables were created to index whether or not the mother had suffered from depression during the study child's early childhood (between 1 and 4 years of age) and mid to late childhood years (between 4 and 11 years of age). Similarly, two variables were created to index whether or not the mother had suffered from an anxiety disorder during the study child's early childhood (between 1 and 4 years of age) and mid to late childhood years (between 4 and 11 years of age). The point prevalence of depression for the 4 and 11 year assessment is also reported⁷. Furthermore, a variable was created to detail the number of time periods from pregnancy to 11 years in which the women experienced an episode of depression (ranging from 0 to 4).

Suicide attempts. In order to provide an in-depth account of the severity of the women's mental health problems, the presence or absence of suicide attempts was coded. During the SADS-L interview at 4 years, women were asked if they had *ever* made a suicide attempt. At the 11 year interview, and in order to cover the missing time period back to the child's 4th birthday, mothers were asked to report whether or not they had made a suicide attempt in the study child's mid to late childhood years (ages 4 to 11 years).

⁷ Due to the insufficient number of women diagnosed with an anxiety disorder, the point prevalence of anxiety disorders is not reported.

3.2.4. Data Analysis

Between group differences on the outcome measure (depressed versus non-depressed) were compared with the Pearson chi-squared test of independence. In all age group comparisons, women in the older mother age group served as the reference category. Where linear trends between the mother's age at first birth and dichotomous outcomes were observed, the Mantel-Haenszel chi-square test of linear associations is reported. Further statistical analyses on the ordinal data (e.g. number of time period the mother was depressed) were made with the Kruskal Wallis test and non-parametric Mann Whitney U test. For continuous measures, between group differences were examined using a univariate analysis of variance test (ANOVA). The Tukey HSD test was used to follow up any significant ANOVA results. Significance was judged at the $p < .05$ level, but trends up to $p < .10$ were also identified.

3.3. Results

3.3.1. The Prevalence and Nature of Affective Disorder from Pregnancy to 11 Years

Of the 176 women, 112 (63.6%) had had at least one episode of a depressive and/or anxiety disorder between the period of the index pregnancy to the study child's 11th birthday. Of the 112 women who met the criteria for a clinically significant mental health problem during the study period, 107 (96%) were diagnosed with a depressive disorder. Of these 107 women, 19 (18%) also received an anxiety disorder diagnosis at some point during the study period. There was significant association between depressive and anxiety disorders, $\kappa = .09$, $p < .05$. However, only 5 women (3%) met the criteria for an anxiety disorder only. Of these 5 women, 3 were diagnosed with generalised anxiety disorder (GAD), 1 was diagnosed with an

adjustment disorder with anxiety, and 1 woman was diagnosed with GAD and an adjustment disorder with anxiety. Thus, the vast majority of women in this sample who were diagnosed with a clinically significant mental health problem were suffering from a depressive disorder. Due to the insufficient number of women suffering from an anxiety disorder, subsequent analyses will focus on depressive disorders. However, it should be noted that anxiety symptoms are a predominant feature of the women's depressive illness. During pregnancy for example, women diagnosed with depression reported significantly more symptoms of anxiety than women without a diagnosis, $M = 6.84$ ($SD = 3.11$) v. $M = 4.5$ ($SD = 2.92$), $F(1,174) = 21.72$, $p < .001$.

3.3.2. The Longitudinal Course of Depression: Sample Trends and Age Group

Differences in the Prevalence Rates at the Different Time Points and Time Periods

The prevalence of depression over the course of the 12-year study period is reported in Table 3.2. Women who entered parenthood during their teenage years were 2.3 times more likely than the women in the older mother age group to have had at least one episode of depression over the course of the study period, $\chi^2(1) = 3.58$, $p < .05$, $OR = 2.29$, (95% $CI = 1.06 - 5.51$). Similarly, in comparison to older mothers, women who entered parenthood in their early twenties were 2.2 times more likely to have experienced at least one episode of depression over the course of the study period, $\chi^2(1) = 4.57$, $p < .05$, $OR = 2.15$, (95% $CI = 1.05 - 4.34$). However, as shown in Figure 3.1, different time points represented heightened periods of risk for both groups of young mothers.

At the sample level, the prevalence of depression was higher in pregnancy and during the first 3 postnatal months than at any of the other time points studied. Figure

3.1 reports the time point prevalence of depression for the women in the different age groups. The prevalence of depression⁸ was 27.8% in pregnancy, 21.6% during the first 3 postnatal months, 18.2% at 1 year, 14% at 4 years and 7% at 11 years. However, there was little difference in the period prevalence of depression between the developmental time periods from pregnancy to 11 years (Table 3.2). It is noteworthy that the prevalence rates of depression are equivalent for primiparous and multiparous women at all assessment points and across all developmental time periods. What is more, for within age-group comparisons, the rates of depression are equivalent for primiparous and multiparous women at each of the assessment points.

Comparison of teenage and older mothers. As shown in Table 3.2, teenage mothers were over 3 times more likely than the women in the older mother age group to suffer from depression during pregnancy, $\chi^2 (1) = 7.20$, $p = .007$, OR = 3.30, (95% CI = 1.03 - 3.95). In contrast, after the antenatal period, teenage mothers were no more likely than the older mothers to suffer from depression during infancy, early childhood or mid-to-late childhood (see Table 3.2). However, when women suffering from depression during infancy were separated into those who were depressed during the first 3 months after childbirth (*postnatal depression*) and those whose depression began after the first 3 months, a significant effect of age group is observed, $\chi^2 (2) = 7.73$, $p = .005$. Planned contrasts revealed that teenage mothers were almost 4 times as likely as the women in the older mother age group to be suffering from postnatal depression, $\chi^2 (1) = 8.10$, $p = .004$, OR = 3.7, (95% CI = 1.45 - 9.38). Of concern, over a third of teenage mothers in this sample (38.7%) suffered from postnatal depression, whereas only 14.6% (13/89) of the older mothers did so. However, 75% (9/12) of the teenage mothers with postnatal depression were depressed in pregnancy. Thus, teenage mothers are at a

⁸ The Ns vary slightly because of missing data at some of the assessment points

heightened risk of depression during the perinatal period, with the majority first becoming depressed in pregnancy.

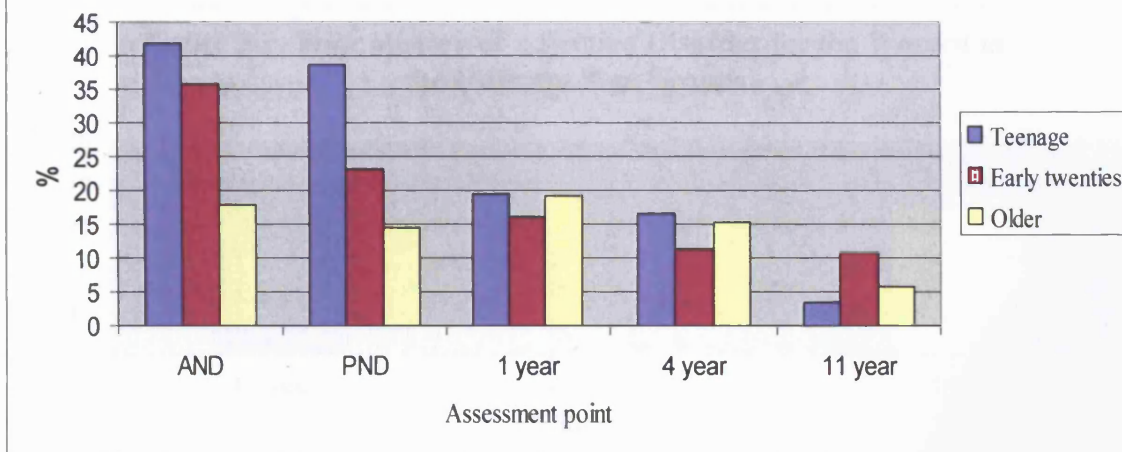
Table 3.2. Prevalence Rates of Depression for the Developmental Time Periods from Pregnancy through the Following 11 Years

	Maternal Age Group			Sample (N=176)	Test Statistics
	≤ 19 (N=31)	20-22 (N=56)	23+ (N=89)		
Antenatal Depression	41.9	35.7	18.0	27.8	$\chi^2 = 8.48, p = .004$
Depression during infancy	41.9	30.4	27.0	30.7	$\chi^2 = 2.14, p = .14$
Depression in early childhood	46.7	35.7	29.2	34.3	$\chi^2 = 3.02, p = .08$
Depression mid-late childhood	30.0	30.4	16.9	23.4	$\chi^2 = 4.36, p = .064$
Depression ever during the study	71.0	69.6	51.7	60.8	$\chi^2 = 6.28, p = .043$

Comparison of early twenties and older mothers. An analogous set of analyses to those performed for teenage mothers were repeated for the women in the early twenties age group. During pregnancy, mothers in their early twenties were almost 2.6 times more likely than the older mothers to be suffering from depression, $\chi^2 (1) = 5.79, p = .012, OR = 2.57, (95\% CI = 1.18 - 5.47)$. After the antenatal period, early twenties mothers were no more likely than the women in the older group to suffering from depression during infancy or early childhood (Table 3.2). In addition, unlike the teenage mothers, women in the early twenties age group were no more likely than the women in the older mother group to be suffering from postnatal depression. For the early twenties mothers, 23.2% (13/56) were suffering from postnatal depression; this is compared to 14.6% of older mothers (13/89). Of the early twenties mothers with postnatal depression, 61.5% (8/13) were depressed in the pregnancy. Finally, during the period of mid-to-late childhood, women in the early twenties group were over 2 times as likely as the women in the older mother group to be suffering from depression, $\chi^2 (1) = 3.65, p < .06, OR = 2.15, (95\% CI = 0.97 - 4.76)$. However, this comparison only approaches statistical significance. Thus, like their teenage counterparts, women who entered

parenthood in their early twenties are at a heightened risk of developing depression during the antenatal period.

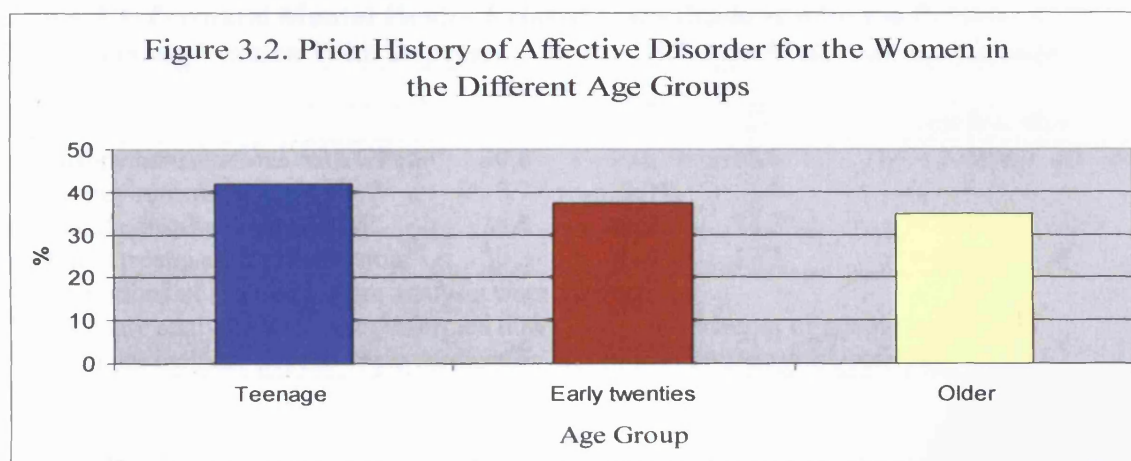
Figure 3.1. The Prevalence of Depression at the Different Assessment Points for the Women in the Different Age Groups



3.3.3. The Relationship between Antenatal Depression and Prior Episodes of Affective Disorder

In light of the high prevalence of antenatal depression among younger mothers, it is important to determine whether women with antenatal depression had suffered from a mental health problem prior to the focal pregnancy. Of the women depressed during pregnancy, almost half (24/49) reported that they had seen a GP for a mental health problem prior to the conception of the study child. Figure 3.2 depicts the proportion of women with a prior history of affective disorder by maternal age group. Of the 65 women who reported suffering from a mental health problem prior to the index pregnancy, 57 (87.7%) had been given a diagnosis of depression by their GP and/or another mental health professional. The remaining women had been diagnosed with an anxiety-related problem. Women with a prior history of affective disorder were

over 2 times more likely than women who had not sought help to become depressed in pregnancy, $\chi^2 (1) = 4.23$, $p = .040$, OR = 2.0, (95% CI = 1.03 - 3.95). Thus, for the women in all three age groups, a prior history of affective disorder is a significant risk factor for antenatal depression.



3.3.4. Consultations with the Primary Care Team among the Women Suffering from Depression during the Perinatal Period

Antenatal depression. Given that over a third of the teenage and early twenties mothers suffered from antenatal depression, it is important to ascertain the proportion of women who sought help from their GP for their illness. All of the women consented for the research team to review their medical information. However, 6 of the 176 women did not have their medical records available for consultation⁹. Of the women suffering from antenatal depression, only 20% (9/46) sought help from their GP for their condition. Table 3.3 reports the number of women suffering with depression in each age group who consulted a member of the primary care team and who were referred onto secondary services. None of the women who sought help for their mental health problem were placed on psychotropic medication and only 2 (4.1%) were referred on to

⁹ The medical records of these 6 women were not available for consultation because they could not be located by the research team. Of these 6 women, 3 were categorised as depressed during pregnancy and 3 were not. Thus, subsequent analyses that use the mothers' medical records are based upon N = 170.

secondary services. None of the women were offered counselling or psychological therapy; largely because of the limited services available at the time. Thus, only 1 in 5 women classified as depressed on the CIS sought help from their GP for their illness, and less than a quarter of these were offered some form of treatment.

Table 3.3. Perinatal Mental Health Related Consultations with the Primary Care Team Among Women With Depression in the Different Maternal Age Groups

	Maternal Age Group			Test Statistics
	≤ 19	20-22	23+	
Pregnancy consultations with GP	30.8	10.0	18.8	$\chi^2 = 2.43, p = .30^i$
Pregnancy referral ⁱⁱ	7.7	0.0	6.3	-----
Postnatal consultations with GP	38.5	41.2	58.3	$\chi^2 = 1.45, p = .52^i$
Postnatal treatment for depression ⁱⁱⁱ	30.8	29.4	27.3	$\chi^2 = 0.53, p = .97^i$

ⁱAssumptions of the Chi-Square analysis were violated

ⁱⁱChi-square analyses were not performed due to the small number of people in each cell

ⁱⁱⁱTreatment includes psychotropic medication and/or psychotherapy/counselling

Depression during infancy. During the first postnatal year the mother's medical records and the health visitors files were similarly reviewed for mental health related consultations. Of the women suffering from depression during their child's infancy 26 out of 52 mothers (50%)¹⁰ had sought help from a member of the primary care team for their illness. Table 3.3 reports the number of women suffering in each age group who consulted a member of the primary care team and who were offered any form of treatment. In terms of treatment, just over a third of the women (10/26) who sought help for their illness were prescribed psychotropic medication. Additionally, 42.3% (11/26) were referred onto secondary services. Women who were granted access to secondary mental health services saw a psychiatrist (N = 4), a psychologist (N = 4), a community psychiatric nurse (N = 2) or a combination of the 3. Thus, these descriptive data extracted from the medical records suggest that women suffering from depression

¹⁰ Of the 176 women included in the current study, 6 did not have their medical records available for consultation (see footnote 9). Two of these women were depressed during the study child's infancy and 4 were not.

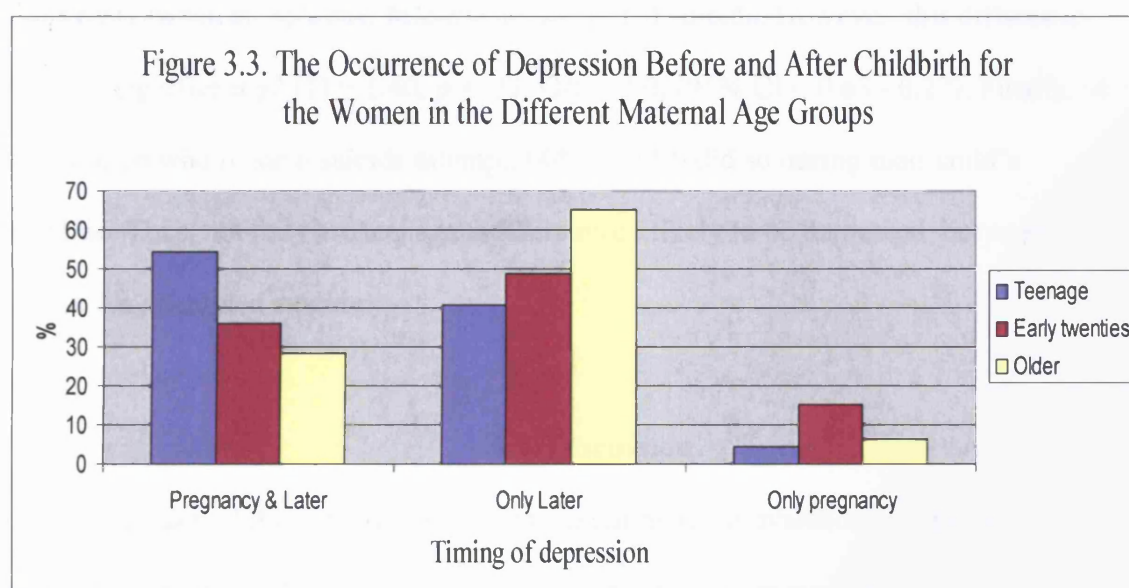
during the perinatal period are more likely to seek treatment during the postnatal months than they are during pregnancy. In addition, when women do seek help from the primary care team, the data suggest that they are more likely to be treated for their mental health problem if it occurs in the postnatal as opposed to the antenatal period.

3.3.5. The Relationship between Antenatal Depression and Subsequent Episodes of Depression

Just under half of the women (45.8%) who were depressed during the study child's lifetime were initially identified as depressed during the index pregnancy. This figure rises to 57.1% for teenage mothers but falls to 42.2% for early twenties mothers. Figure 3.3 depicts the relationship between antenatal depression and subsequent episodes of illness for the mothers in the different age groups. Women who were depressed during pregnancy had a four-fold increased odds of a further episode of depression during the child's lifetime, $\chi^2 (1) = 16.45, p < .001$, OR = 4.64, (95% CI = 2.13 - 10.10).

Furthermore, the vast majority of women (79.6%) who were depressed during pregnancy were classified as depressed during one or more developmental time periods after childbirth. Accordingly, there was substantial continuity in depression for individual women from pregnancy to 11 years, kappa coefficient = .26, $p < .001$, and in terms of the number of time periods that the mother was depressed, a significant effect of age group was observed on the Kruskal Wallis test, $\chi^2 (2) = 9.97, p < .008$. In comparison to the women in the older mother age group, teenage mothers were depressed during a greater number of time periods over the study period, $N = 119$, Mann-Whitney $U = 919.0, Z = -2.69, p < .008$. Likewise, relative to older mothers, the women in the early twenties age group were depressed during a greater number of time

periods from pregnancy to 11 years, $N = 145$, Mann-Whitney $U = 1929.5$, $Z = -2.41$, $p < .02$. Thus, both groups of young mothers are at a heightened risk of depression during the perinatal period, and in comparison to the women in the older mother age group, teenage and early twenties mothers go on to experience more episodes of depression during the childbearing years.



3.3.6. The History of Suicide Attempts across the Life course for the Women in the Different Age Groups

The previous analyses have revealed higher rates of depression in younger mothers. Depression is closely linked to suicide, and so it is important to examine whether women who entered parenthood before the normative childbearing age are at elevated risk of attempted suicide. Across the life course, 11.2% (20/176) of the women had made one or more suicide attempts. Typically, an overdose of a controlled prescription drug (e.g. an anti-depressant or a tranquiliser) was the method of choice. However, other methods (e.g. the severing of arteries with knives or razors) were also used. The between group comparison yielded a significant effect of maternal group,

$\chi^2 (2) = 5.64, p = .018$; 22.6% of teenage mothers (7/31), 12.5% of early twenties mothers (7/56), and 6.7% of older mothers (6/89) had made a suicide attempt at some point during their life. Thus, teenage mothers were over 3 times as likely as the women in the older mother age group to make a suicide attempt, $\chi^2 (1) = 6.10, p = .014$, OR = 3.4, (95% CI = 1.23 - 9.31). The analogous comparison between the women in the early twenties and older mother age group revealed that women who entered parenthood in their early twenties are a two-fold risk of attempted suicide. However, this difference was not significant $\chi^2 (1) = 1.40, p = .22$, OR = 2.0, (95% CI = 0.63 - 6.22). Finally, of the women who made a suicide attempt, 60% (12/20) did so during their child's lifetime. Thus, not only are teenage mothers more likely to be depressed, but were also at risk for attempted suicide.

3.4. Discussion

The aim of the current study was to examine the prevalence of depression during pregnancy and throughout the subsequent childbearing years among women who entered parenthood as adolescents and in their early twenties. Over the course of the study period, almost 3 in every 4 teenage and early twenties mothers experienced at least 1 episode of depression. However, among the young mothers, particular time periods represented heightened sources of risk. During pregnancy, and relative to older mothers, women who began childbearing in their adolescent and early twenties years were significantly more likely to be depressed. Over a third of the teenage and early twenties mothers were depressed during the antenatal months, and the majority went on to experience subsequent episodes of illness during their child's lifetime. It is noteworthy that during pregnancy, anxiety symptoms were a predominant feature of the

women's depressive illness, regardless of whether or not they were diagnosed with a comorbid anxiety disorder diagnosis.

During the months following childbirth, women who began childbearing during their teenage years were over 4 times as likely as the women in the older mother age group to suffer from postnatal depression. However, for the majority of women in the teen mother group, their 'postnatal depression' represented a continuation of their antenatal mood disorder; 75% of teenage mothers with postnatal depression were depressed in pregnancy. Women in the early twenties age group were no more likely than the older mothers to suffer from postnatal depression; and subsequent to the first 3 months after childbirth, but before the child's first birthday, a greater proportion of the older mothers became depressed. Thus, differences between women who began childbearing at different ages were not found when the entire infancy period was considered. Nonetheless, relative to the women in the older mother age group, both the teenage and the early twenties mothers spent a greater proportion of their child's lifetime in a depressive episode. What is more, the teenage mothers, but not the early twenties mothers were significantly more likely than the women in the older mother age group to have made a suicide attempt at some point during their life course.

A major strength of the current study was that it recruited a community sample of women within the primary care setting, and as such, it was possible to gain access to the women's medical notes. During pregnancy, only 20% of the women with depression consulted with their GP, and less than a quarter of these were offered some form of treatment. During the first postnatal year, half of the women with depression consulted a member of the primary care team, and over a third of these women were treated for their illness. The small number of women who consulted their GP and/or were offered treatment prevented meaningful age group analyses. Nonetheless, these data suggest

that women suffering from depression during the perinatal period are more likely to seek treatment during the postnatal than the antenatal months. In addition, when women do seek help from the primary care team, treatment appears more likely if the mental health problem occurs in the postnatal, as opposed to the antenatal period. These findings may reflect the greater awareness of postnatal as opposed antenatal depression that exists in the health service, and the public domain.

The results reported in this chapter extend the findings of past research which has found young mothers, specifically teenage mothers, to show an increased prevalence of depression during the postnatal period (e.g. Barnett et al, 1996; Rich-Edwards et al, 2005). However, the analyses contained in this chapter highlight the need for detection efforts to begin in pregnancy; particularly among women who entered parenthood in their early twenties, as unlike adolescent mothers, women who begin childbearing during 'emerging adulthood' (Arnett, 2000), are not perceived to be a risk group. Thus, a shift in focus from the postnatal to the antenatal period is needed in both research and practice. What is more, the current findings draw attention to the fact that for the majority of women, depression during pregnancy is part of a wider picture of recurring episodes of illness. Identifying and subsequently treating young mothers suffering with depression during pregnancy could help prevent a lifetime spent in and out of depressive episodes.

The current findings are in line with those of previous studies which fail to find an association between parity and antenatal depression (e.g. Marcus et al, 2003; Rich-Edwards et al, 2006). This result draws attention to the fact that women who enter parenthood in their teenage or early twenties years are at risk of depression in subsequent pregnancies. Thus, women who enter parenthood at young ages, but who are not necessarily young at the time of a subsequent pregnancy are also at risk. However,

while the current design was informative in that it allowed the examination of first and subsequent pregnancies, detailed information surrounding the multiparous women's actual transition to parenthood was not available in the existing sample.

As outlined in chapter 2, maternal depression, particularly when it occurs during the perinatal period, is of concern for children as well as mothers. As discussed in chapters 1 and 2, whilst the adverse outcomes of children born to young mothers are well documented, fewer studies move beyond explaining such outcomes in terms of broad measures of the social environment. By examining the factors that are more proximal to children's lives, particularly when they occur during 'sensitive periods of development', a better understanding of the processes that promote sub-optimal outcomes can be obtained. Thus, the next chapter in this thesis seeks to test whether any increased risk of cognitive, behavioural or emotional problems shown by the offspring of young mothers is accounted for by exposure to their mother's mental health problems during different stages of development. When addressing this question, a host of alternate explanations will also be considered.

Chapter 4

EMPIRICAL STUDY 2

Young Motherhood, Antenatal and Postnatal Experiences and Children's Cognitive, Behavioural and Emotional Development

4.1. *Introduction*

Children born to young mothers, specifically teenage mothers, are more likely than the offspring of older women to score lower on tests of cognitive ability and to demonstrate patterns of behavioural and emotional maladjustment (Coley & Chase-Lansdale, 1998; Moffitt et al, 2002; Social Exclusion Unit, 1999). Much previous work has examined the risk of cognitive, behavioural and emotional problems among the offspring of young mothers in early and mid childhood (Black et al, 2002; Moffitt et al, 2002; Sommer et al, 2000). However, far less attention has been paid to the development of these children in late childhood and adolescence. Furthermore, whilst young motherhood has been shown to be associated with differences in children's behavioural and emotional functioning across the normative range, links to more serious clinical disorders have not been established, especially among a UK population. Thus, important questions regarding the severity and level of impairment caused by these children's difficulties have not been addressed.

In addition, whilst the experiences of children born to teenage mothers are well documented, far less attention has been paid to the development of children born to young mothers who entered parenthood in their early twenties. In light of the shift toward delayed marriage and parenthood that has occurred over the last three decades,

there is good reason to expect the offspring of early twenties mothers to be at risk of adverse outcomes (see Chapter 1). Accordingly, the first aim of the present study is to examine the risk of cognitive, behavioural and emotional problems among the adolescent offspring of teenage and early twenties mothers.

4.1.1. Maternal Depression and Children's Cognitive, Behavioural and Emotional Functioning

Studies that have sought to explain why it is that the children of young mothers are at risk of adverse outcomes have highlighted maternal depression as a key determinant. For example, in their analyses of the effects of teenage parenthood on 2- to 3-year-old children's risk for conduct, emotional and hyperactivity problems, Berrington and colleagues (2005) found that the mother's symptoms of anxiety and depression accounted for the observed association. Likewise, in two different samples of adolescent parents and their 3- to 5-year-old children, Sommer and colleagues (2000) and Black and colleagues (2002b) found that the mother's symptoms of depression predicted children's cognitive, behavioural and emotional outcomes.

Collectively, these findings confirm those of studies conducted with mothers across the full parental age range, where it has been found that growing up in a household with a depressed mother is detrimental to children's development (Campbell & Cohn, 1997; Goodman & Gotlib, 1999). However, as the studies conducted with young mothers employed a cross-sectional design, or they relied upon single informants, the causal status of maternal depression is challenged. In addition, little reference is made in the young mother studies to the broader evidence base on maternal depression—where the importance of the timing of the child's initial exposure to their mother's depressive illness is well documented (e.g. Hay & Kumar, 1995; Hay, Pawlby, Waters & Sharp, 2008; Murray, 1997; Murray et al., 1999).

4.1.2. Postnatal Depression and Children's Cognitive, Behavioural and Emotional Functioning

Attention to the timing of initial exposure to maternal depression arose from prior theory and empirical evidence which asserts that experiences in infancy have a profound effect upon subsequent development (Ainsworth, 1969; Bowlby, 1958; Lorenz, 1935/1970; Beach & Jaynes, 1954; Hess, 1959). In line with these pre-programming hypotheses are the findings which link maternal depression in the postnatal period to deficits in child functioning (e.g. Field et al, 1995, Galler et al, 2000; Hay et al, 2008). For example, children exposed to postnatal depression have been found to show cognitive impairments (Hay et al, 2001), socio-emotional problems (Essex et al, 2001; Halligan et al, 2007), behavioural difficulties (Essex et al, 2001; Hay et al, 2003) and depressogenic cognitions (Murray et al, 2001).

Various explanations of the processes behind the association between postnatal depression and children's cognitive and regulatory deficits have been proposed, all of which focus on the depressed mother's behaviour toward her infant. For example, compared to well women, depressed mothers have been found to be withdrawn, intrusive, and asynchronous during interactions with their infants (Cohn et al 1986; Cohn & Tronick 1989; Pelaez-Nogueras, Field, Cigales, Gonzalez & Clasky 1994). Such disturbances in the quality of the caregiving environment are believed to have long lasting effects via their impact upon the mastery of the developmental tasks of infancy. For instance, postnatal depression is thought to disrupt attachment formation and infants' ability to learn to regulate their attention and emotions (Goodman & Gotlib, 1999; Hay, 1997; Weinberg et al, 1999). Thus, these early insults to an infant's developing cognitive and biological systems, brought about by suboptimal parenting practices, are believed to promote later cognitive, behavioural and emotional deficits.

4.1.3. *Antenatal Depression and Anxiety and Children's Cognitive, Behavioural and Emotional Functioning*

More recently however, researchers have questioned whether the apparent effects of postnatal depression could be accounted for by disturbances in maternal mood during pregnancy, including antenatal depression and anxiety. Depressive and anxiety symptoms during gestation have been found to be associated with objective and subjective measures of cognitive and self-regulatory problems in infancy (Bergman et al, 2007; Davis et al, 2004; Field et al, 2004; Huizink et al, 2002, 2003). Childhood follow-up studies of offspring exposed to high levels of anxiety symptoms in pregnancy have produced complementary findings. For example, high levels of antenatal anxiety predict 4-to-6 year old children's behavioural and emotional difficulties (O'Connor et al, 2002, 2003), as well as symptoms of ADHD in later childhood and adolescence (Van den Bergh & Marcoen, 2004; Van den Bergh, et al., 2005). Importantly, in these studies, associations between antenatal mood and children's adjustment problems remained after postnatal anxiety (Davis et al, 2004; Huizink et al, 2002, 2003; O'Connor et al, 2002, 2003; Van den Bergh & Marcoen, 2004; Van den Bergh, et al., 2005) and depressive symptoms were accounted for (Davis et al, 2004; Huizink et al, 2002, 2003; O'Connor et al, 2002, 2003).

The cause of these antenatal mood effects is yet to be determined, but likely mechanisms include foetal exposure to the maternal stress hormone cortisol, and placental insufficiency (Barker, 1998; Field et al, 2005; Gitau et al, 1998; O'Keane, 2006). This 'foetal origins hypothesis' asserts that the antenatal exposure to elevated cortisol affects the development and functioning of the foetus's hypothalamic—pituitary—adrenal axis (HPA), rendering the child more susceptible to later mental illness (O'Keane, 2006; O'Connor, 2003). Animal and human studies lend support to this position. For example, a number of studies have found that alterations to the

maternal antenatal HPA axis affect the functioning and structure of the brain in antenatally stressed rats (Fameli et al, 1994; Welberg & Seckl, 2001).

In humans, compared to pregnant women with few depressive symptoms, mothers with high depressive symptoms in pregnancy have been found to have higher cortisol levels (Field et al, 2004; Lundy et al, 1999). During pregnancy, cortisol is hypothesised to pass through placental barriers to affect the foetal environment (O'Keane, 2006). Correspondingly, infants exposed to elevated cortisol levels in utero have similarly high cortisol levels postpartum (Field et al, 2004; Lundy et al, 1999). Elevated cortisol is a known risk factor for depression (Goodyer et al, 1996; Goodyer, Herbert, Tamplin, & Altham, 2000), particularly in the offspring of depressed women (Halligan et al, 2007). Thus, biological mechanisms have been highlighted as a determinant of adverse child outcomes in the context of antenatal depression.

As we have seen in Chapter 3, women who enter parenthood in their teenage and early twenties years are at heightened risk of developing depression during pregnancy and the months following childbirth. As previously discussed, children exposed to antenatal and postnatal maternal psychopathology are at elevated risk of developing cognitive, behavioural and emotional problems. Thus, it is possible that the disturbances shown by the children of young mothers in the cognitive, behavioural and emotional domains of functioning are accounted for by their antenatal and/or postnatal exposure to their mother's mental health problems. Therefore, the second aim of the current study is to test whether any increased risk of cognitive, behavioural or emotional problems shown by the offspring of young mothers is accounted for by their exposure to maternal depression during the perinatal period. In addition, in light of the high comorbidity between depression and anxiety (Kendler et al, 2007; Moffitt et al, 2007) and the evidence base linking antenatal anxiety to child outcome, it is

important to evaluate any effects of antenatal and/or postnatal depression with reference to the child's exposure to anxiety when in utero. To my knowledge, no existing study of young mothers has addressed these questions, especially within the context of a prospective longitudinal design.

4.1.4. Additional Dimensions of the Antenatal Environment and Children's Cognitive, Behavioural and Emotional Outcomes

A focus on the mother's mental health during the antenatal and postnatal months draws attention to other sources of influence. During pregnancy, for example, there may be teratogenic effects on the foetus. Young mothers, in common with women of any age who are suffering from a mental illness, are more likely than other mothers to expose their foetus to cigarette smoke, alcohol, and both legal (prescribed psychotropic medication) and illegal drugs (Pajulo et al, 2001; Romano et al, 2006; Stewart & Streiner, 1994; Zoccollio & Hughes, 1996; Zuckerman et al, 1989). Given that the antenatal exposure to these teratogens is associated with cognitive, behavioural, and emotional deficits in children (Brook, Brook, & Whiteman, 2000; Carvalho et al, 2006; Julvez et al, 2007; Olds, 1997; Suri et al, 2007; Wakschlag & Hans, 2002), it is important to determine whether any effects of age, attributable to disturbances in the mother's mood during pregnancy, are accounted for by other antenatal insults.

4.1.5. Additional Dimensions of the Postnatal Environment and Children's Cognitive, Behavioural and Emotional Outcomes

After the pregnancy period, particular dimensions of the postnatal environment have been highlighted as key determinants of child functioning. For example, low birth weight is a reliable indicator of subsequent developmental

problems (Reijneveld et al, 2006; Richards, Hardy, Kuh & Wadsworth, 2001). In addition, not being breastfed, which transfers nutritional benefit (Lucas, Morley, Cole, Lister, & Leeson Payne, 1992), and promotes the bond between mother and child (Lavelli & Poli, 1998), has been linked with deficits in child functioning (Allen, Lewinsohn, & Seeley, 1998; Anderson, Johnstone, & Remley, 1999; Kramer et al, 2008; Quinn et al, 2001). These associations between postnatal experiences and children's development are pertinent to the current line of enquiry as young mothers give birth to smaller babies (Watcharaseranee, Pinchantra, & Piyaman, 2006) and they are less likely to breastfeed their children (Henderson et al, 2003; White et al, 1993). Thus, it is important to determine whether any effects of maternal age, attributable to the mother's depression during the perinatal period, are better explained by other dimensions of the postnatal environment.

4.1.6. The Post-Infancy Environment and Children's Cognitive, Behavioural and Emotional Outcomes

On top of considering antenatal and postnatal sources of influence, it is important to control for parallel dimensions of the child's later environment. Developmental theorists have long pointed out the need to account for the influence of the child's later environment in any test of early experience effects (King, 1958; Kessen, 1960; Solomon & Lessac, 1968). This is particularly pertinent to the question of whether maternal psychopathology in the perinatal period accounts for the adverse outcomes experienced by the offspring of young mothers as depression often presents as a lifelong, episodic illness (Halligan et al, 2007). For example, analyses in Chapter 3 revealed that the majority of women who suffered from depression during the perinatal period went on to experience subsequent episodes.

In the context of young motherhood, the effects of exposure to maternal depression have been documented. For example, children born to young mothers who suffered from depression during their children's early to middle childhood years have been found to show deficits in their cognitive, behavioural and emotional functioning (Berrington et al, 2005; Black et al, 2002b; Shaw et al, 2006; Sommer et al, 2000). Likewise, studies outside of the young mother literature have reported analogous findings. For example, children of mothers who were depressed during early, mid, and late childhood have been found to show increased rates of cognitive, behavioural and emotional problems (Feng, Shaw, & Silk, 2008; Jenkins & Curwen, 2008; Miner & Clarke-Stewart, 2008; Sohr-Preston & Scaramella, 2006). Thus, later exposure, rather than early exposure to maternal depression may thereby account for the adverse child effects.

Furthermore, in the context of young motherhood, other dimensions of the subsequent environment, purported to be the result of the mothers 'off-time' early transition to parenthood (Elder, Caspi, & Burton, 1988), have been shown to be important in understanding the link between maternal age at first birth and deficits in child functioning (e.g. Black et al 2002b; Fergusson & Woodward, 1999; Jaffee et al, 2001). In particular, family structure, socio-economic status and the number of siblings in the home are key features of the childrearing environment previously shown to be important in the context of teenage parenthood (Jaffee et al, 2001; Fergusson & Woodward, 1999; Shaw, Lawlor & Najaman, 2006). Thus, it is important to determine whether any effects of maternal age, initially attributable to dimensions of the antenatal and/or postnatal environment, are better explained by key features of the subsequent childrearing environment.

4.1.7. The Pre-Childbearing Environment and Children's Cognitive, Behavioural and Emotional Outcomes

As well as considering the influence of the later environment, life-course theory draws attention to the importance of the pre-childbearing environment. As discussed in Chapter 1, life-course theory proposes that individuals with distinct social and psychological attributes (e.g. a predisposition to psychopathology and/or a low IQ) select into particular non-normative, off-time transitions (e.g. early parenthood); and it is these pre-existing maternal characteristics that explain a child's risk of later adverse outcomes (Elder, 1997; Jaffee et al, 2001). These pre-existing maternal characteristics then can be seen to exert genetic, as well as environmentally mediated, influences upon the child. For example, twin designs have shown there to be a significant genetic component to cognitive ability (Harlaar, Dale, & Plomin, 2007; Petrill et al, 2004) and the children of depressed mothers are thought to be at genetic as well as environmental risk of behavioural and emotional problems (Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005).

Thus, in an ideal world, tests for the effects of early exposure to maternal depression as the mediating link between young motherhood and indices of child maladjustment would be conducted within the context of a genetically informative design. Unfortunately, the current study, like all other known previous studies of young mothers, cannot provide estimates of genetic influence. However, in the current design, it was possible to test whether any effects of early exposure to maternal depression were better accounted for by the mother's history of mental health problems prior to the study child's conception. In addition, it was possible to control for the mother's IQ, a relatively stable characteristic that predated entry to parenthood. Thus, whilst not providing a direct test of genetic influence, the mother's history of depression and her IQ will have been influenced by her genetic inheritance,

as well as her experiences, and so these measures can serve as a proxy for the intergenerational transmission of disorder and cognitive ability across generations.

4.1.8. *The Aims and Objectives of the Current Study*

In summary, the present study tested 1) if children born to women who entered parenthood in their early twenties are as at risk of cognitive, behavioural and emotional problems as the offspring of women who entered parenthood as teenagers; 2) whether the elevated risk of cognitive, behavioural and emotional problems shown by the children of young mothers could be attributed to the children's exposure to their mothers' antenatal and/or postnatal depression; 3) whether any effects of the mother's depression are better explained by alternate dimensions of the antenatal and/or postnatal environment; 4) whether any explanatory effects of antenatal or postnatal depression are better accounted for by the mother's IQ and/or prior history of mental health problems; and 5) whether any explanatory effects of the antenatal and/or postnatal environment(s) are better explained by key features of the subsequent childrearing environment.

4.2. Method

4.2.1. *The Families*

The 176 families who took part in this study were those described in the preceding chapter. Sampling and design details along with the information that describes the mothers and their situation is provided in chapter 3. The characteristics of the children and their environments can be seen in Table 4.1.

Table 4.1: Characteristics of the Children and their Environment at the 11 Year Assessment

	Maternal Age Group			Sample (N=176)
	≤19 (N=31)	20-22 (N=56)	23+ (N=89)	
Child's Sex is Male (%)	38.7	53.6	46.1	47.2
Child's Age (Years and Months)	11.1 (2.2)	11.1 (1.9)	11.1 (1.5)	11.1 (1.8)
First Born (%)	38.7	28.6	61.8	47.2
White British Origin (%)	74.2	80.4	66.3	72.2
Working Class Household (%)	93.5	92.9	80.9	86.9
2 Biological Parents in the Home (%)	32.3	37.5	71.9	54.2
1 or more Siblings in the Home (%)	87.1	92.9	88.8	89.8

Families were contacted when the child was approaching their eleventh birthday. The majority of children (98%) were in the last year of primary school at the time of the 11 year assessment. However, two children were in the year above and one child was in the year below their chronological age group. 58% of children were educated within the same school for the duration of their primary education, 27% had attended 2 schools, 12% had attended 3 schools, and 3% had attended 4 or more different primary schools.

4.2.2. Procedure

All phases of the study were approved by the Ethics Committee of the Institute of Psychiatry, King's College London. After complete description of the study, written informed consent was obtained from the participants. The primary caregiver gave permission for the research team to contact the child's school for appointments to be made to assess the child's cognitive functioning. Permission was also granted for the class teachers to report on the child's behavioural and emotional functioning using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1999; Goodman,

Meltzer, & Bailey, 1998). The over-arching procedural details and the information about the assessments prior to the 11 year follow-up are provided in chapter 3. The specific details for the assessment and analyses of the children's outcomes are described below.

To assess the children's behavioural and emotional functioning, mothers¹¹ and children were interviewed at home, by different researchers, using the Child and Adolescent Psychiatric Assessment (CAPA; Angold et al, 1995). The majority of children's general cognitive ability was assessed in school (84%) using the Wechsler Intelligence Scale for Children (WISC-III^{UK}; Wechsler, 1992). Where it was not possible to carry out the assessment in school, either because the child's birthday fell in the holiday time (13%), or because of the child's own preference (3%), it was carried out at home. The researcher who assessed the child was blind to the information obtained during the mother's interview.

4.2.3. Measures of the Children's Functioning at Age 11

Cognitive functioning. Children's general cognitive ability was assessed in school with the WISC-III^{UK} (Wechsler, 1992). Eleven of the 13 WISC subtests were administered to yield the Full Scale IQ score which was used in this study as an index of children's general cognitive ability. The WISC-III has a mean of 100 and a standard deviation of 15 and numerous studies attest to the reliability and validity of the WISC-III for clinical, research and educational purposes (Wechsler, 1992).

Behavioural and emotional functioning. To provide a continuous measure of children's behavioural and emotional problems across the normative range, the Strengths and Difficulties Questionnaire was used (SDQ; Goodman, 1999; Goodman,

¹¹ If the mother was not the primary care-giver, then the father or guardian was interviewed (N = 3)

Meltzer, & Bailey, 1998). This 25-item questionnaire was designed to provide a continuous measure of children's behavioural and emotional problems, along with their prosocial tendencies, across the normal and abnormal range. In order to gain a holistic picture of the child's functioning, mothers¹², teachers and the children themselves completed the appropriate version of the SDQ. Numerous studies attest to the validity and reliability of this questionnaire (see Goodman, 1997, 1999, 2001; Mellor, 2004).

In the present study, the three informants' reports on the conduct, emotional, and hyperactivity subscales were used. For the present analyses, the conduct and hyperactivity subscales were summed to form a global measure of children's externalising behaviour problems (see also Hay & Pawlby, 2003). This composite measure showed good internal consistency, $\alpha = .71$ for children, $\alpha = .89$ for teachers, and $\alpha = .83$ for mothers. In all cases the internal consistency of the composite measure was better than that achieved by the original subscales. For the emotional problems scale, moderate internal consistency was observed, $\alpha = .63$ for children, $\alpha = .74$ for teachers and $\alpha = .62$ for mothers.

In order to provide detailed information on the severity of children's behavioural and emotional problems, the Child and Adolescent Psychiatric Assessment was used (CAPA; Angold et al., 1995). The CAPA is a psychiatric interview that elicits information about symptoms contributing to a wide range of DSM-IV diagnoses. Parents and children were interviewed separately, by different researchers, about the child's symptoms of clinically significant psychopathology. Throughout the CAPA, diagnostic information relates to a three- month 'primary period' of reporting because shorter periods ensure more accurate recall (Angold et al,

¹² If the mother was unavailable to complete the SDQ, the child's father or guardian provided the required information (N = 3).

1996). Diagnoses and symptom scales were generated by computer algorithms, based on ‘combined reports,’ where a symptom is regarded as being present if either the parent or child reports it. Diagnoses were made with reference to the functional impairment or incapacities section of the CAPA, which relates the symptoms to the child’s ability to function at a developmentally appropriate level in relationships with family, peers, and teachers, and in activities at school, home and in the community. Diagnoses made using the CAPA algorithms show acceptable levels of test-retest reliability (Angold & Costello, 2000).

4.2.4. Measures of the Antenatal Environment

Substance use in pregnancy. At the antenatal assessments during the second and third trimesters of pregnancy, mothers reported the number of cigarettes smoked per day and the units of alcohol drunk per week. Composite measures of foetal exposure to smoking and alcohol were constructed by averaging the scores reported at each interview.

Antenatal depression and anxiety. A dichotomous variable that detailed whether or not the mother had met ICD-9 criteria for clinically significant depression was created. Diagnoses were based on the information collected when the mothers completed the Clinical Interview Schedule during the second and third trimesters of pregnancy (CIS: Goldberg et al, 1970). Detailed information on the construction and use of this measure is provided in chapter 3. Due to the insufficient number of women diagnosed with an antenatal anxiety disorder (see chapter 3), a composite measure of anxiety symptoms was used (Snaith, Bridge, & Hamilton, 1971). Further details about these measures have been provided in chapter 3.

4.2.5. Measures of the Postnatal Environment

Maternal childbearing age. Maternal age at first birth was recorded in whole years. Based upon their age at the birth of their first child, mother-child dyads were classified into three, theoretically meaningful maternal age groups. The categorisation of participants into maternal age groups was based upon the existing literature, and upon national norms. The age groups are as follows: (1) mothers aged 19 and under (teenage mothers); (2) mothers aged between 20 and 22 (early twenties mothers); and (3) mothers aged 23 and over (older mothers). Two dummy variables were created to represent children in the teenage and early twenties groups. The reference category in all analyses represented the children in the older mother group. Please see Study 1 (pages 59 – 60) for further justification of the age group definitions.

Birth weight. The infant's birth weight was ascertained at the home visit at 3 months post partum and corroborated by the medical notes.

Breastfeeding. The duration of breastfeeding was ascertained at 3 and 8 months postpartum. At both time points, mothers completed feeding questionnaires. Based on the information provided, a composite measure which detailed the number of weeks the child was breastfed was constructed.

Postnatal depression. A dichotomous variable was created that detailed whether or not the mother had met the diagnostic criteria for a clinically significant episode of depression. Mothers were judged to have suffered from postnatal depression if they experienced a depressive episode that onset within the first 3 months following childbirth. Detailed information about this measure was provided in chapter 3.

4.2.6. Measures of the Later Environment

Socio-economic status. Social class was determined using the Goldthorpe and Hope social grading of occupations (Goldthorpe & Hope, 1974). The highest ranked employment that the mother ever had was used to determine the family's socioeconomic status. Families were then classed as either working or middle class. The information was provided upon entry into the study.

The family environment. At the 11 year interview, mothers reported on the number of siblings in the home and whether or not the child lived with both biological parents.

Maternal depression. At the 1 year assessment, mothers were interviewed about their current mental state using the CIS. At the 4 and 11 year assessments, mothers were interviewed about their current mental state and experience of symptoms retrospective to the last assessment point, using the SADS-L. Two variables were created to measure the children's exposure to maternal depression in early childhood (between 1 and 4 years of age) and mid to late childhood (between 4 and 11 years of age). Again, further details about these measures were provided in chapter 3.

4.2.7. Measures of the Pre-childbearing Environment

The mother's intellectual ability. The Wechsler Adult Intelligence Scale (WAIS-R; Wechsler, 1981) was used to assess the mother's intellectual ability. Four of the subtests – Block Design, Similarities, Vocabulary and Arithmetic – were completed by the mothers during the home visit at 4 years. Women who had not been assessed at 4 years were tested at the eleven year follow up. The WAIS-R is scored to

a formula that takes into account the correlation with the full WAIS in terms of the subtests' reliability and age-scaled scores (Brooker & Cryr, 1986).

The mother's prior history of mental health problems. This measure was used as an index of the mother's history of affective disorder prior to the conception of the study child. Further details about this measure are provided in chapter 3.

4.2.8. Data Analysis

Distributions were examined for normality and linearity. Where continuous variables were found not to follow the Gaussian distribution, transformations took place following the guidelines of Tabachnick and Fidell (2001). Depending on the distributional properties of relevant variables, the significance of interrelations between maternal age at first birth and measures of the pre-childbearing, antenatal, postnatal and post-infancy environments were examined with the Pearson's or Spearman's correlation coefficient, Significant between-group differences on dichotomous outcomes were tested using the Pearson chi-squared test of independence. Where linear trends between the mother's age at first birth and dichotomous outcomes were observed, the Mantel-Haenszel chi-square test of linear associations is reported.

For interval data, between group differences were examined using a univariate analysis of variance test (ANOVA). Significant results were followed up with planned contrasts or the Tukey HSD test. Either the Mann Whitney U test or the Kruskal Wallis test was used for nonparametric data. To control for the Type 1 error inflation associated with multiple testing, multivariate analysis of variance (MANOVA) was used when more than one continuous measure was available for each domain of child functioning. Significance was judged at the $p < .05$ level, but trends up to $p < .10$ were



also identified. Hierarchical linear or logistic regression analyses were used to examine further any significant differences between the children in the different maternal age groups. Thus, the data analysis steps outlined below were adhered to for each domain of child functioning only when significant between-group differences had been observed.

Firstly, within each domain of child functioning, the magnitude of the difference between the children in the teenage and/or early twenties group(s) relative to the offspring in the older mother group was estimated. In all analyses, the older mother group served as the reference category. Secondly, to examine the importance of the intrauterine environment, any significant between group differences were re-estimated, after the antenatal measures that were significantly associated with the outcome variable were entered individually, and as a set. This stage of the analysis determined whether any increased risk of maladjustment experienced by the children of young mothers would be reduced when exposure to maternal depression during pregnancy and other dimensions of the antenatal environment were taken into account. Thirdly, to examine the importance of the postnatal environment, the second stage of the analysis was repeated with the postpartum measures that were significantly associated with the outcome variable. Fourthly, to examine how much the effect of age at first birth was accounted for by dimensions of the antenatal and postnatal environment, all perinatal variables that were associated with the outcome variable were considered simultaneously. Finally, subsequent models tested whether any effects of the antenatal and postnatal measures may be better explained by: (1) analogous characteristics of the mother that predated the birth of the child; and (2) key features of the subsequent childrearing environment.

4.3. Results

4.3.1. Results for Children's Emotional Functioning

4.3.1.1. Descriptive Analyses

Continuous measures of the children's emotional functioning, reported by teachers, mothers and children, were provided on the SDQ. Across the three informants, the mean and standard deviation values for the emotional problems subscale of the SDQ (see Table 4.2) were in line with the age-appropriate United Kingdom (UK) national norms (www.sdqinfo.com). In terms of agreement between informants, children's ratings of emotional problems were correlated with teachers' ratings, $r(176) = .28, p < .01$, and with mothers' ratings, $r(176) = .28, p < .01$. The correlation between mothers' and teachers' reports of children's emotional difficulties did not reach significance $r(176) = .05, p = .24$.

In terms of severe emotional disturbance, twenty-seven children (15.3%) met DSM-IV criteria for an emotional disorder. In line with the findings of the large epidemiological studies of this age group (Costello et al, 2003), anxiety disorders were the most common form of emotional disturbance shown by the children in this sample. Twenty-one children (12%) met DSM-IV criteria for an anxiety disorder¹³, and eleven children (6%) met criteria for depressive illness (i.e. major depression or depression not otherwise specified). Of the children diagnosed with a depressive disorder, four (36%) were also diagnosed with an anxiety disorder. Thus, there was significant association between depressive and anxiety disorders, $\kappa = .19, p < .01$. Among the children demonstrating severe emotional disturbance, there was no

¹³ Of the 21 children diagnosed with an anxiety disorder, 16 (76%) were diagnosed with separation anxiety disorder and 5 (24%) were diagnosed with a phobic disorder e.g. social phobia/agoraphobia.

significant sex difference in the rate of clinically significant disorder. Ten boys (12%) and 17 girls (18%) were diagnosed with an emotional disorder.

Table 4.2: Children's Mean Scores with Standard Deviations on the SDQ

	Maternal Age Group			Sample (N = 176)
	≤19 (N = 31)	20-22 (N = 56)	23+ (N = 89)	
Teacher rated emotional problems	2.1(1.8)	1.8(2.2)	1.7(2.1)	1.8(2.1)
Mother rated emotional problems	1.8(2.3)	1.6(1.7)	1.9(2.1)	1.8(2.0)
Child rated emotional problems	3.4(2.0)	3.3(2.5)	3.1(2.1)	3.2(2.1)
Teacher rated externalising behaviour	5.0(4.6)	4.5(4.6)	3.3(3.9)	4.0(4.3)
Mother rated externalising behaviour	5.9(4.5)	5.5(4.3)	5.0(4.2)	5.3(4.3)
Child rated externalising behaviour	7.0(3.5)	6.2(3.7)	6.2(3.2)	6.4(3.4)

4.3.1.2. Associations between Maternal Age at First Birth and Emotional

Functioning

The three informants' reports on the SDQ, which provided a continuous measure of children's general emotional problems, were entered into a MANOVA. Examination of the diagnostic tests and associated graphics indicated that the assumptions of the MANOVA had been met. A significant effect of maternal age group across the three informant's reports was not observed, $F(6,342) = 0.43, p = .86$. Thus, the children in the three maternal age groups did not differ in their average score across the normative range of emotional problems, as reported by mothers, teachers and the children themselves.

In contrast, when the risk of more severe emotional disturbance was considered, as indexed by a DSM-IV diagnosis on the CAPA, a significant effect of age group was observed, $\chi^2(2) = 5.82, p < .05$. By age 11, 19.4% of children born to teenage mothers (6/31), 23.2% of children born to early twenties mothers (13/56), and 9% of children born to older mothers (8/89) had developed an emotional disorder. Planned contrasts revealed that the risk of emotional disorder among the offspring of

teenage mothers was 2.4 times greater than it was for the children of older mothers, which was a non-significant trend, $\chi^2(1) = 2.40, p < .10$. For the children in the early twenties group, the risk of developing an emotional disorder by age 11 was 3.1 times greater than it was for the children in the older mother group, $\chi^2(1) = 5.62, p < .02$, CI = 1.18 - 7.96. Thus, relative to the children of older mothers, the risk of developing an emotional disorder by late childhood was greater for the children whose mothers entered parenthood in their early twenties than it was for the offspring of teenage mothers. Given that the comparison between the children of teenage and older mothers was non-significant, subsequent multivariate analyses will examine why it is that relative to the offspring of older mothers, children born to women who entered parenthood in their early twenties are at elevated risk of developing an emotional disorder.

Table 4.3: Antenatal Experiences

	Maternal Age Group				Test Statistics
	≤19 (N = 31)	20-22 (N = 56)	23 + (N = 89)	Sample (N = 176)	
Depressed (%)	41.9	35.7	18.0	27.8	$\chi^2(1) = 8.48, p < .004$
Alcohol (%)	25.8	35.7	50.6	41.5	$\chi^2(1) = 6.80, p < .009$
Smoke (%)	54.8	50.0	28.1	39.8	$\chi^2(1) = 9.34, p < .002$
Cigarettes per day (<i>M & SD</i>)	6.2 (7.6)	6.9 (9.2)	2.5 (5.0)	4.6 (7.3)	$F_{(2,173)} = 7.62, p < .001$
Anxiety (<i>M & SD</i>)	5.2 (3.8)	5.4 (2.7)	5.0 (3.2)	5.2 (3.2)	$F_{(2,173)} = 0.26, p = .77$

4.3.1.3. Why do the Children Born to Early Twenties Mothers Show Elevated Rates of Emotional Disorder?

The intrauterine environment. The mothers in each age group were not significantly different in their number of anxiety symptoms during pregnancy (see Table 4.3). However, a significant effect of maternal age group was observed for the consumption of alcohol (see Table 4.3). During pregnancy, the older mothers were

more likely to drink alcohol than the early twenties mothers. However, this difference only reached the non-significant trend level, $\chi^2(1) = 3.10, p < .08$. Nevertheless, neither alcohol nor anxiety was associated with the child's risk of emotional disorder (see Table 4.4). Thus, these measures of the intrauterine environment do not account for the elevated rates of emotional disorder shown by the children in the early twenties group.

As shown in chapter 3, women who entered parenthood in their early twenties were 2.6 times more likely than older mothers to suffer from depression during pregnancy (see Table 4.3). In addition, depression during pregnancy is significantly associated with the child's risk of emotional disorder (see Table 4.4). Thus, antenatal depression was entered into a regression model after the magnitude of the between group differences was estimated. Depression during pregnancy was a significant predictor of the child's risk of emotional disorder. When mothers had not been depressed during pregnancy, 11 of 109 children (10.1%) had an emotional disorder. In contrast, if mothers had been depressed during pregnancy, 10 of 36 adolescents (27.8%) had an emotional disorder, $\chi^2(1) = 6.84, p < .01$, OR = 3.43 (CI = 1.31 - 8.94). As can be seen in Table 4.5, antenatal depression accounted for 16.3% of the variance in emotional disorder that was previously explained by the mother's age at first birth.¹⁴ Thus, when exposure to depression during pregnancy was taken into account, the magnitude of the between group differences was reduced to a non-significant trend ($p < .07$).

¹⁴ As calculated by $(3.06 - 2.56) \div 3.06$

Table 4.4. Inter-correlations among Maternal Age, the Antenatal and Postnatal Environment and Children's Cognitive, Behavioural and Emotional Outcomes

	1	2	3	4	5	6	7	8	9	10	11
1. Maternal Age	---										
2. AND	-.23***	---									
3. PND	-.21**	.32***	---								
4. Alcohol	.20**	-.09	.08	---							
5. Anxiety	-.03	.34***	.19**	-.07	---						
6. Smoking	-.24***	.17*	.22**	.00	.17*	---					
7. Feeding	.31***	-.06	-.15*	.16*	-.19**	-.25***	---				
8. Weight	-.04	-.01	-.07	-.03	-.08	-.27***	.10†	---			
9. IQ	.30***	-.17*	-.17*	.02	-.09	-.13*	.37***	.11†	---		
10. ED	-.16*	.23**	.12†	-.01	.05	.15*	-.13*	-.13*	-.18**	---	
11. DBD	-.08	.25**	.16*	.12†	.05	.13*	-.02	-.09	-.24***	.30***	---

N = 176. † < .10. *p < .05. **p < .01. ***p < .001; AND = Antenatal Depression; PND = Postnatal depression; ED = Emotional Disorder; DBD = Disruptive Behavior Disorder; IQ = Intelligence Quotient.

The other dimension of the intrauterine environment that predicted the child's risk of emotional disorder was the foetal exposure to cigarette smoking (see Table 4.4). As can be seen in Table 4.3, half of the women who entered parenthood in their early twenties smoked cigarettes when pregnant. In comparison to older mothers, early twenties mothers were 2.6 times more likely to smoke when pregnant, $\chi^2(1) = 7.15, p < .01, CI = 1.27 - 5.15$. Moreover, while both groups of young mothers smoked more cigarettes per day than the women in the older group, it was the mothers in their early twenties who smoked the most cigarettes (see Table 4.3). As shown in Table 4.5, smoking accounted for 13.7% of the variance in emotional disorder that had been previously explained by the mother's age at first birth. However, the

magnitude of the between group difference in the child's risk of emotional disorder remained significant after the effect of smoking was considered.

Table 4.5. Children's risk of emotional disorder: Comparisons between the early twenties group relative to the older mother group and the extent to which the between group differences can be accounted for by dimensions of the antenatal, postnatal and post-perinatal environment.

	Unadjusted Odds Ratio	Adjusted Odds Ratio	Decrease in Odds Ratio (%)
Antenatal Environment			
Antepartum depression	3.06*	2.56†	16.3%
Smoking	3.06*	2.65*	13.7%
Postnatal Environment			
Breast feeding	3.06*	2.61†	14.7%
Birth weight	3.06*	3.06*	0.0%
The Post-Perinatal Environment			
Family structure	3.06*	2.25	26.5%
Mothers depression 4-11	3.06*	2.77*	9.5%
1.All antepartum measures	3.06*	2.27	25.8%
2.All postpartum measures	3.06*	2.61†	14.7%
3.All perinatal measures (1 & 2)	3.06*	2.03	33.6%
4.All post-perinatal measures	3.06*	2.26	26.1%

† $p < .10$; * $p < .05$

A subsequent logistic regression model examined the simultaneous influence of both antenatal risk factors. Foetal exposure to smoking and depression accounted for 25.8% of the variance in emotional disorder that was previously explained by the mother's age at first birth. Accordingly, the magnitude of the between group differences in the child's risk of emotional disorder was attenuated to non-significance ($p = .12$) when these measures were considered. However, only antenatal depression remained a significant predictor of emotional disorder when both measures were considered simultaneously.

The postnatal environment. Emotional disorder in late childhood was positively, but not significantly, associated with postnatal depression (see Table 4.4). Accordingly, this measure did not account for the elevated risk of emotional disorder shown by the children in the early twenties group. On the other hand, emotional

disorder in late childhood was associated with the child's birth weight (see Table 4.4). However, the children in the different maternal age groups were not significantly different in their birth weight (see Table 4.6), and this measure did not predict the child's risk of emotional disorder in a regression model (see Table 4.5).

Table 4.6: Postnatal Experiences

	Maternal Age Group				Test Statistics
	≤19 (N = 31)	20-22 (N = 56)	23 + (N = 89)	Sample (N = 176)	
Depressed (%)	38.7	23.2	14.6	21.6	$\chi^2 (1) = 7.73, p < .005$
Breast-Fed (%)	54.8	40.0	70.8	58.4	$\chi^2 (2) = 12.96, p < .002$
No. weeks breast fed (<i>M & SD</i>)	4.2 (8.9)	4.5 (9.3)	12.2 (13.0)	8.3 (11.9)	$F_{(2,173)} = 12.31, p < .001$
Birth weight (<i>M & SD</i>)	3400 (454)	3315 (591)	3325 (524)	3335 (533)	$F_{(2,173)} = 0.28, p = .75$

In contrast, not having been breastfed predicted the child's risk of emotional disorder, and this measure did discriminate between the children in the different maternal age groups (see Table 4.6). Older mothers were 3.8 times more likely than early twenties mothers to breast feed their children, $\chi^2 (1) = 14.06, p < .001, CI = 1.85 - 7.58$. As shown in Table 4.5, breastfeeding accounted for 14.7% of the variance in emotional disorder that was previously explained by the mother's age at first birth. Thus, the magnitude of the between group differences was reduced to a non-significant trend ($p < .06$) when the duration of breastfeeding was accounted for.

The antenatal and postnatal environment and the mother's prior history of depression. Regression analyses re-estimated the magnitude of the between group differences after the child's exposure to the antenatal and postnatal risk factors were taken into account. When smoking, antenatal depression, and breastfeeding were entered simultaneously these measures accounted for 33.6% of the variance in emotional disorder that was previously explained by the mother's age at first birth (see Table 4.5). Accordingly, the magnitude of the between group differences was

reduced to non-significance ($p = .19$). However, only depression during pregnancy remained a significant predictor of children's emotional disorder when the simultaneous influence of the antenatal and postnatal risk factors was considered. A subsequent model examined the influence of the mother's prior history of affective disorder. This measure did not predict children's emotional disorder (see Table 4.7). Findings with regard to antenatal depression were unchanged.

Effects of the subsequent childrearing environment. Social class and the number of siblings in the home were not associated with the child's risk of emotional disorder (see Table 4.7). In contrast, as shown in Table 4.7, family structure was associated with emotional disorder. Children who were not living with both biological parents at age 11 were 3.3 times more likely than children living with both biological parents to have an emotional disorder, $\chi^2(1) = 7.61, p < .01, CI = 1.37 - 8.10$. For the age group comparison, almost two thirds of children born to early twenties mothers did not live both biological parents at age 11, as opposed to fewer than one third of children born to older mothers (see Table 4.8).

As shown in Table 4.5, not living with both biological parents at age 11 accounted for 26.5% of the variance in emotional disorder that was previously explained by the mother's age at first birth. Accordingly, when family structure was considered, the magnitude of the between group differences became non-significant ($p = .12$). Of particular relevance, there is significant association between antenatal depression and family structure, $r(176) = .16, p < .05$. Accordingly, depression during pregnancy is a significant predictor of whether or not the child lives with both biological parents at age 11. Therefore, a subsequent regression model examined the significance of family structure whilst simultaneously accounting for the influence of antenatal depression. Only the mother's depression in pregnancy predicted emotional

disorder: the effect of not living with both biological parents was reduced to a non significant trend ($p < .10$).

As shown in chapter 3, 39 of the 49 women depressed during pregnancy (79.6%) were depressed again during the child's lifetime. Thus, it is important to determine whether the child's risk of emotional disorder may be better explained by exposure to maternal depression after the perinatal period. The mother's experience of depression during early childhood (1 to 4 years) was not significantly associated with the child's risk of emotional disorder (see Table 4.7). Accordingly, maternal depression during early childhood did not account for the elevated rates of emotional disorder in the early twenties group, nor did it remove the effect of the mother's depression during pregnancy.

In contrast, maternal depression during mid to late childhood (4 to 11 years) was associated with children's emotional disorder (see Table 4.7). Children born to women who entered parenthood in their early twenties were more likely to be exposed to maternal depression between the ages of 4 to 11 years, $\chi^2(1) = 3.65, p < .06$. However, this comparison is just outside of the $p < .05$ significance level. As shown in Table 4.5, maternal depression during mid to late childhood accounted for 9.5% of the variance in emotional disorder that was formerly explained by the mother's age at first birth. However, the magnitude of the between group difference in the child's risk of emotional disorder remained significant ($p < .04$) when exposure to maternal depression in late childhood was considered.

Table 4.7. Inter-correlations among Maternal Age, Characteristics of the Mother, the Post-Infancy Environment, and Children's Cognitive, Behavioural and Emotional Outcomes

	1	2	3	4	5	6	7	8	9	10	11
1. Maternal age	---										
2. Social class	-.17*	---									
3. No. of siblings	-.16*	-.07	---								
4. Family structure	-.36***	-.02	-.03	---							
5. Maternal IQ	.26***	.34***	-.12†	-.18**	---						
6. PPH	-.05	-.02	-.01	.00	.00	---					
7. Depression 1-4	-.13*	-.03	-.03	-.14*	-.06	.32***	---				
8. Depression 4-11	-.15*	-.10	.03	-.14*	-.14*	.11†	.40***	---			
9. IQ	.27***	.21**	-.18**	-.21**	.50***	-.02	-.04	-.06	---		
10. ED	-.16*	-.07	.03	.21**	-.10†	.03	.09	.18**	-.18**	---	
11. DBD	-.08	.04	.15*	.14*	-.05	.05	.08	.17*	-.24***	-.30	---

† $p < .10$; * $p < .05$. ** $p < .01$. *** $p < .001$. ED = Emotional Disorder; DBD = Disruptive Behavior Disorder; PPH = Previous Psychiatric History Before the Index Pregnancy

A subsequent model examined the significance of antenatal depression whilst simultaneously accounting for the influence of the mother's later depression. When entered together, both measures of maternal depression accounted for 19.6% of the variance in emotional disorder that was formerly explained by the mother's age at first birth. Thus, the magnitude of the between group differences was reduced to a non-significant trend ($p < .08$) when both measures were considered together. However, in this final model, maternal depression during the ages of 4 to 11 years was not a significant predictor of emotional disorder ($p = .25$), and the effect of antenatal depression was reduced to a non-significant trend ($p < .07$), which reflects the fact that antenatal depression is one episode in a lifetime illness.

4.3.2. Results for Children's Behavioural Functioning

4.3.2.1. Descriptive Analyses

Behavioural maladjustment. Continuous measures of the children's behavioural functioning, provided by teachers, mothers and children, were provided on the SDQ (see Table 4.2). Across the three informants, the mean and standard deviation values for the SDQ conduct and hyperactivity subscales were in line with UK national norms (www.sdqinfo.com). Children's ratings on the composite externalising behaviour scale correlated with teachers' ratings, $r(176) = .32, p < .01$, and with mothers' ratings, $r(176) = .40, p < .01$. Similarly, mothers' ratings on the SDQ externalising behaviour scale correlated with teachers' ratings, $r(176) = .50, p < .01$.

In terms of severe behavioural problems, thirty-one children (18%) met DSM-IV criteria for a disruptive behaviour disorder (DBD). Twenty-one of them (12%) met the criteria for conduct disorder (CD), twenty-two (14%) met criteria for oppositional defiant disorder (ODD) and six children (3.5%) were diagnosed with attention deficit hyperactivity disorder (ADHD). Three children (1.7%) met criteria for ADHD only; the other three children diagnosed with ADHD also met criteria for CD and ODD. Thirteen of the children (59%) diagnosed with ODD also met criteria for CD. Thus, there was substantial comorbidity between CD and ODD, $\kappa = .52, p < .001$. Twenty-two boys (27%) and nine girls (10%) were diagnosed with DBD, a significant difference, $\chi^2(1) = 8.59, p < .01$, OR = 3.36, CI = 1.45 - 7.82.

4.3.2.2. Associations between Maternal Age at First Birth and Children's Behavioural Functioning

Behavioural maladjustment. The three informants' reports on the SDQ externalising scale, which provided a continuous measure of children's behavioural problems, were entered into a MANOVA. Examination of the diagnostic tests and associated graphics indicated that the assumptions of the MANOVA had been met. A significant effect of maternal age group across the three informant's reports was not observed, $F(6,342) = 0.94, p = .47$. Thus, the children in the three maternal age groups did not differ in their average score across the normative range of behavioural problems, as reported by mothers, teachers and the children themselves.

When the risk of severe behavioural disturbance was considered, a significant maternal age group difference in the risk of developing a DSM-IV disruptive behaviour disorder (DBD) was not observed, $\chi^2(2) = 1.24, p = .54$. By age 11, 22.6% of children born to teenage mothers (7/31), 19.6% of children born to early twenties mothers (11/56), and 14.6% of children born to older mothers (13/89) had developed a disruptive behaviour disorder. Thus, relative to the offspring of older mothers, the children in the two young mother groups were not more likely to display either behavioural problems, or more serious patterns of disruptive behaviour. Therefore, multivariate analyses for the behavioural domain of functioning will not be pursued.

4.3.3. Results for Children's Cognitive Functioning

4.3.3.1. Descriptive Analyses

Children's IQ scores were normally distributed and the formal inference tests confirmed that this measure of cognitive functioning was neither significantly skewed nor kurtotic (Tabachnik and Fidell, 2001). The mean IQ value for the children in this sample was in line with population norms, $M = 97.5$ ($SD = 17.4$). Scores ranged between 60 and 141. There were no statistical outliers in the distribution at the sample or maternal age group level. The mean IQ scores for boys, $M = 98.1$ ($SD = 20.0$) and girls $M = 96.9$ ($SD = 14.8$) were not significantly different, $F(1,174) = 0.17$, $p = .68$. Children who were diagnosed with an emotional disorder had significantly lower IQ scores than children not diagnosed, $M = 90.1$ ($SD = 17.5$) vs. $M = 98.8$ ($SD = 15.3$), $F(1,174) = 5.91$, $p < .02$. Similarly, children who were diagnosed with a disruptive behaviour disorder had significantly lower IQ scores than children not diagnosed, $M = 90.1$ ($SD = 17.5$) vs. $M = 98.8$ ($SD = 15.3$), $F(1,174) = 5.91$, $p < .02$.

4.3.3.2. Associations between Maternal Age at First Birth and Children's Cognitive Functioning

As predicted, there was a significant, positive association between maternal age at first birth and children's IQ (see Table 4.4). However, when observing the means it is evident that this relationship is not entirely linear. Children born to women who made the transition to parenthood in their early twenties had the lowest average IQ, $M = 90.2$ ($SD = 16.6$). Offspring born to teenage mothers had an average IQ of $M = 95.1$ ($SD = 13.8$). The group of children with the highest mean IQ were those born to older mothers, $M = 102.9$ ($SD = 17.4$). Accordingly, there was a significant effect of maternal age group on children's IQ, $F(2,173) = 10.37$, $p < .001$. Planned contrasts

revealed that children born to teen mothers had significantly lower IQ scores than the offspring of older mothers, $t(173) = -2.25, p < .03$. Likewise, children born to early twenties mothers had significantly lower IQ scores than the offspring of older mothers, $t(173) = -4.47, p < .001$.

4.3.3.3. Why do Children Born to Teenage and Early Twenties Mothers Show Deficits in Cognitive Functioning?

The intrauterine environment. Antenatal anxiety and the consumption of alcohol were not associated with children's cognitive ability (see Table 4.4). Thus, these measures did not explain the cognitive deficits shown by the children in both young mother groups. In contrast, smoking during pregnancy was associated with children's cognitive ability (see Table 4.4). As was true for the early twenties mothers, teenage mothers were significantly more likely than the women in the older mother group to smoke when pregnant, $\chi^2(1) = 7.23, p < .01$, OR = 3.1, CI = 1.27-5.15 (see Table 4.3). As shown in Table 4.9, the magnitude of the between group differences was reduced after the child's exposure to cigarette smoke was taken into account. However, relative to the older mother group, the differences between the children in teenage, $t(172) = -2.06, p < .05$, and the early twenties group, $t(172) = -4.16, p < .001$ remained significant (see Table 4.9).

The other dimension of the intrauterine environment associated with the child's cognitive ability was antenatal depression (see Table 4.4). As found in chapter 3, women who entered parenthood in their teenage and early twenties years were significantly more likely than the mothers in the older group to suffer from depression during pregnancy. As shown in Table 4.9, after antenatal depression had been taken into account, the magnitude of the difference in IQ scores between the children in the teenage and older mother groups was reduced to a non-significant trend, $t(172) =$

-2.06, $p < .06$. In contrast, the IQ point difference between the children in the early twenties and older mother group remained significant after antenatal depression had been taken into account, $t(172) = -4.15, p < .001$.

A subsequent model examined the simultaneous influence of antenatal depression and the mother's smoking. The extent of the difference between the children in the teenage and older mother groups was further reduced, $t(171) = -1.80, p < .08$. However, relative to the children in the older mother group, the offspring of early twenties mothers continued to show deficits in their cognitive functioning, $t(171) = -3.93, p < .001$.

The postnatal environment. Cognitive ability was not associated with children's birth weight. In contrast, postnatal depression was associated with cognitive ability (see Table 4.4). As shown in chapter 3, it was the children in the teen mother group who were the most likely to be exposed to maternal depression after childbirth, $\chi^2(1) = 8.10, p < .01, OR = 3.7, CI = 1.45-9.38$. The analogous comparison between the women in the early twenties and older mother groups was in the predicted direction, though non-significant, $\chi^2(1) = 1.73, p = .19$. Thus, after accounting for the influence of postnatal depression, the extent of the IQ point difference between the children in the teenage and older mother groups was attenuated to a non-significant trend, $t(172) = -1.83, p < .07$. In contrast, the children in the early twenties group continued to show significantly lower IQ scores, even after postnatal depression had been taken into account, $t(172) = -4.31, p < .001$ (see Table 4.9).

The other dimension of the postnatal environment associated with children's cognitive ability was the duration of breastfeeding (see Table 4.4). Post-hoc analyses revealed that relative to the women in the older group, teenage mothers, $t(173) =$

-3.46, $p < .001$, and early twenties mothers, $t(173) = -4.47$, $p < .001$ breast fed their children for a significantly fewer number of weeks (see Table 4.6). Thus, after the number of weeks the child was breast fed was taken into account, the difference in the IQ scores of children born to teenage versus older mothers was non-significant, $t(172) = -1.26$, $p = .21$. In contrast, after accounting for the duration of breastfeeding, the magnitude of the IQ point difference between the children in the early twenties and older mother group attenuated, yet was still significant, $t(173) = -3.14$, $p < .01$ (see Table 4.9).

Table 4.8: Post-Perinatal Experiences and the Mother's Intellectual Ability

	Maternal Age Group				Test Statistics
	≤19 (N=31)	20-22 (N=56)	23+ (N=89)	Sample (N=176)	
Lives with 2 biological parents (%)	32.3	37.5	71.9	54.0	$\chi^2(2) = 23.53$, $p < .001$
Working class (%)	93.5	92.9	80.9	86.9	$\chi^2(2) = 4.77$, $p < .03$
Depressed 1 to 4	46.7	35.7	29.2	34.3	$\chi^2(2) = 3.02$, $p < .08$
Depressed 4 to 11	30.0	30.4	16.9	23.4	$\chi^2(2) = 3.42$, $p < .07$
No. of siblings (<i>M & SD</i>)	1.9	2.1	1.5	1.8	$F_{(2,173)} = 4.35$, $p < .03$
Mother's IQ (<i>M & SD</i>)	86.6(9.5)	87.3(12.1)	94.1(13.7)	90.6(13.7)	$F_{(2,173)} = 7.10$, $p < .001$

A subsequent model re-estimated the extent of the between group differences after the simultaneous influence of postnatal depression and breastfeeding was considered. The extent of the difference between the children in the early twenties and older mother groups was further reduced, yet still significant, $t(170) = -2.73$, $p < .01$ (see Table 4.9). Thus, after controlling for suboptimal experiences during the months following childbirth, children of teenage mothers no longer show deficits in their cognitive functioning. In contrast, postnatal experiences partly, but not wholly, account for the deficits shown by the children in the early twenties group (see Table 4.9).

Effects of the subsequent childrearing environment and the mother's

intellectual ability. Maternal depression after the perinatal period was not associated with children's cognitive ability (see Table 4.7). In contrast, family structure was associated with cognitive ability. The children in both young mother groups were less likely than the offspring of older mothers to live with both biological parents at age 11 (see Table 4.8). Accordingly, after accounting for differences in family structure, attenuation in the between group differences was observed (see Table 4.9). The extent of the difference in IQ points between the children in the teenage and older mother groups was reduced to a non-significant trend, $t(172) = -1.71, p < .09$. In contrast, after accounting for differences in family structure, the offspring of early twenties mothers were still significantly more likely than the children of older mothers to show deficits in their cognitive functioning, $t(172) = -3.79, p < .001$.

As well as family structure, the number of siblings in the home was also associated with children's cognitive ability (see Table 4.7). Post hoc analyses revealed that relative to the children in the older mother group, the offspring of early twenties, but not those of teen mothers, grew up with significantly more siblings in the home, $t(172) = 2.90, p < .005$. Thus, after accounting for differences in the number of siblings, attenuation in the between group differences was observed (see Table 4.9). However, growing up with a greater number of siblings in the home did not fully account for the cognitive deficits shown by the children in both young mother groups. Relative to the older group, the differences between the children in teenage, $t(172) = -2.25, p < .04$, and the early twenties group, $t(172) = -4.05, p < .001$, remained significant.

Table 4.9. The β weights and children's IQ point difference scores: Comparisons between the early twenties and teenage group relative to the older mother group and the extent to which the between group differences can be accounted for by dimensions of the antenatal, postnatal and subsequent environment.

	Teenage mother group		Early twenties mother group	
	Adjusted β	Adjusted IQ Difference	Adjusted β	Adjusted IQ Difference
Antenatal Environment				
Smoking	-.16*	-.7.28*	-.33***	-12.14***
Depression	-.15†	-.6.75†	-.32***	-11.87***
Postnatal Environment				
Breast feeding	-.10	-.4.32	-.24**	-8.99**
Postnatal depression	-.14†	-.6.42†	-.33***	-12.14***
Post-Infancy Environment				
Family structure	-.14†	-.6.15†	-.30***	-11.23***
Number of siblings	-.16*	-.7.19*	-.31***	-11.66***
Social Class	-.15†	-.6.70†	-.31***	-11.62***
Maternal Characteristics				
Mothers IQ	-.11	-.4.83	-.27***	-9.60***
IQ Difference before adjustment	-.17*	-.7.76*	-.34***	-12.62***
All antenatal measures	-.14†	-.6.43†	-.31***	-11.54***
All postnatal measures	-.07	-3.39	-.24*	-8.76**
All perinatal measures	-.07	-2.95	-.23**	-8.40**
All post-infancy measures	-.09	-4.15	-.24**	-8.89**
All measures	.01	0.30	-.13	-4.58

†p < .10; *p < .05; **p < .01; *** p < .001

The other dimension of the subsequent environment significantly associated with children's cognitive ability was the family's socio-economic status (see Table 4.7). As shown in Table 4.8, the children in both young mother groups were more likely than the offspring of older mothers to grow up in a working class household. Accordingly, after the family's socioeconomic status was considered, the extent of the deficit in IQ points shown by the children in the teen mother group was reduced to a non-significant trend, $t(172) = -1.95, p < .06$. In contrast, even after adjustment for differences in the family's socio-economic status, children in the early twenties group continued to show deficits in their cognitive functioning when compared to the offspring of older mothers, $t(172) = -4.11, p < .001$.

A subsequent model examined the magnitude of the between group differences after the simultaneous influence of family structure, socio-economic status and the number of siblings in the home was considered. As shown in Table 4.9, the difference in the IQ scores of children born teenage versus older mothers was reduced to non-significance, $t(170) = -1.15, p = .25$. In contrast, relative to the children in the older mother group, the offspring of women who entered parenthood in their early twenties continued to show deficits in their cognitive functioning, even after key features of the later environment had been taken into account, $t(170) = -2.93, p < .01$. Of the subsequent environment measures, not living with both biological parents was mostly strongly associated with children's general cognitive functioning.

Effects of the mother's intellectual ability. As to be expected, maternal IQ was positively associated with children's cognitive ability. Relative to the women in the older group, both the teenage mothers, $t(173) = -2.89, p < .01$, and the early twenties mothers, $t(173) = -3.16, p < .005$, had significantly lower IQ scores (see Table 4.8). As shown in Table 4.9, the difference in the IQ scores of children born teenage versus older mothers was reduced to non-significance when the mother's IQ was taken into account, $t(172) = -1.00, p = .318$. In contrast, relative to the children in the older mother group, the offspring of early twenties mothers continued to demonstrate deficits in their cognitive functioning, $t(172) = -3.26, p < .001$.

Effects of the mother's intellectual ability and the antenatal, postnatal and subsequent environment. A final model re-estimated the magnitude of the between group differences after the perinatal risk factors, measures of the subsequent environment, and the mother's intellectual ability were considered simultaneously. Accordingly, the between group differences for the children in the teen versus older mother group was non-significant, $t(166) = -0.15, p = .88$. In contrast, the between

group differences for the children in the early twenties versus older mother group was reduced to a non-significant trend, $t(166) = -1.89, p < .07$ (see Table 4.9). However, further examination of the individual measures revealed that smoking, breastfeeding, postnatal depression, the number of siblings in the home, and the mother's IQ were the key variables that reduced the between group differences to non-significance.

4.3.4. Comparing the Mother's Age at First Birth versus the Mother's Age at the Study Child's Birth in the Prediction of Children's Cognitive and Emotional Outcomes.

Based on prior theory and research (Elder, 1997; Jaffee et al, 2001; Nagin et al, 1997), it was predicted that the children born to women who made an off-time early transition to parenthood (teenage and early twenties mothers) would be more likely to show patterns of maladjustment, even if the mother was no longer a teenager, or in her early twenties at the time of the study child's birth. To test this hypothesis, hierarchical logistic and linear regression analyses were conducted on the measures of child functioning that showed a significant association with the mother's age at first birth (emotional disorder and cognitive ability). For each analysis, the mother's age at the study child's birth was entered at the first step, and the mother's age at first birth was entered at the second step.

The mother's age at the study child's birth did not predict the child's risk of emotional disorder ($\beta = -.078$, Wald (1) = 3.022, $p = .08$). In contrast, even after accounting for the effect of the mother's age at the study child's birth, maternal age at first birth was a significant predictor of whether or not the child would develop an emotional disorder ($\beta = -.133$, Wald (1) = 3.85, $p < .05$). Similarly, the mother's age at the study child's birth did not predict children's cognitive ability ($\beta = .052$, $p = .49$).

However, even after accounting for the effect of the mother's age at the study child's birth, the mother's age at first birth was a significant predictor of children's cognitive ability ($\beta = -.216$, $p < .001$). Thus, a mother's age at first birth is a significant predictor of children's emotional and cognitive outcomes, above and beyond the effect of the mother's age at the study child's birth.

4.4. Discussion

4.4.1. *Summary of the Main Findings*

In this multi-method, multi-informant longitudinal study, it was the children born to women who made the transition to parenthood in their early twenties who showed the greatest risk of adverse outcomes. Relative to the children in the older mother group, the offspring of early twenties mothers showed the greatest deficits in their cognitive functioning and the highest risk of developing a clinically significant emotional disorder. Thus, in this sample, and contrary to past research, offspring of teenage mothers were not the group of children most 'at risk' in terms of their mothers age at entry into parenthood. However, relative to the children in the older mother group, the offspring of teenage mothers did show small, but significant deficits in their cognitive functioning and a slight, though non-significant, increased risk of emotional disorder. Surprisingly, the children in both young mother groups did not show elevated rates of behavioural problems, nor an increased risk of more severe patterns of disruptive behaviour.

Whilst the children of early twenties mothers were expected to display levels of risk that are comparable to the offspring of teenage mothers, elevated rates of cognitive deficits and emotional disorder were not expected. These findings have

significant implications for policy makers and practitioners as, at present, the literature on maternal age and offspring risk, and the resulting intervention strategies are predominantly concerned with teenage mothers and their children. Whilst not contesting the fact that adolescent mothers and their children constitute an ‘at risk’ group, the findings of this study clearly demonstrate that women who enter parenthood after their teenage years, but before the normative childbearing age are equally, and in this case, more likely than teenage mothers to confer risks to their children.

The fact that the children in the different maternal age groups did not differ in their display of behavioural problems, nor in their risk of more severe patterns of disruptive behaviour stands in contrast to the findings of past research. However in other samples, young maternal age is more heavily confounded with indices of socio-economic status, and it is true that when this confound is taken into account, the effect of young motherhood on children’s disruptive behaviour often disappears (e.g. Jaffee et al, 2001; Fergusson & Woodward, 1999). Thus, the fact that the children in this sample are at elevated risk of behavioural problems because of their socio-economic position, and because of their residence in a large metropolitan area, may account for the lack of association between young motherhood and children’s disruptive behaviour. What is more, the finding that there was an effect of the mother’s age at first birth on children’s risk of emotional disorder, but not on mean differences on a questionnaire measure of emotional problems suggests that only a subgroup of children born to young mothers are at risk. These findings stand in contrast to the stereotypic viewpoint often portrayed in the media that young motherhood is universally detrimental to children’s lives.

4.4.2. Antenatal Experiences and Children's Cognitive and Emotional Functioning

In terms of explaining the increased risk of cognitive and emotional problems shown by the children of young mothers, key features of the antenatal environment were identified. In particular, after exposure to depression during pregnancy was taken into account, the elevated risk of emotional disorder shown by the children in the early twenties group was reduced to the level of a non-significant trend. What is more, the ability antenatal depression had in attenuating the between group difference was found to be somewhat independent of alternate measures of adversity that extended into and beyond the perinatal period. For example, when examined individually, smoking during pregnancy, breastfeeding, and family structure each reduced the extent of the age at first birth effect. However, when the influence of these measures was considered alongside that of antenatal depression, it was the mother's depression during pregnancy that accounted for the greatest proportion of the attenuation effect. Indeed, compared to the women in the older group, early twenties mothers (as well as women in the teenage group) were significantly less likely to be living with the child's biological father, less likely to have breast fed their child, and more likely to have smoked during pregnancy. Thus, the identification of young mothers suffering from depression during pregnancy would likely lead to the detection of a group of women who place their children at multiple sources of risk.

However, the results of this study also show that in any test of the effect of the antenatal environment, attention needs to be given to the importance of the subsequent childrearing environment. While the mother's depression during the postnatal and early childhood years did not account for the elevated rates of emotional disorder shown by the children in the early twenties group, exposure to maternal depression during mid to late childhood did appear to have an effect. For example,

the finding that the influence of antenatal depression is reduced when the mother's depression during mid to late childhood is considered suggests that lines of research beyond those that focus on the mother's and the child's HPA axis are needed. While the current design and sample size limits a true test of these differential effects, it is likely that the children of women who are depressed during pregnancy carry genetic as well as environmental risk of affective disorder. What is more, cumulative exposure to maternal depression and the impact this has on family life creates gene-environment correlation that potentiates the child's risk. Thus, the elevated rates of emotional disorder shown by the children in the early twenties group likely reflects the interplay of genetic and environmental processes.

Antenatal depression and smoking also had small but detectable effects upon children's cognition. Again, it was the mother's depression during pregnancy that accounted for the greatest proportion of the age at first birth effect. The exact mechanisms through which antenatal depression exerts its influence are beyond the scope of the current study. In the present sample, the absence of hormonal data renders a direct test of the 'foetal programming hypothesis' impossible. In addition, given the degree of association between antenatal depression and smoking, it is evident that larger samples are needed to tease apart the proportional influence of the different antenatal risk factors. Nonetheless, the findings of the present study do show that the association between young motherhood and adverse child outcome is reduced when key dimensions of the antenatal environment are taken into account. Thus, intervention programmes that treat the mother's depression and those that focus on smoking cessation may help improve the cognitive and emotional outcomes of children born to young mothers.

4.4.3. Postnatal Experiences and Children's Cognitive and Emotional Functioning

The children in this sample who were breastfed had better cognitive and emotional outcomes. Unfortunately, less than half of the women in the early twenties group, and just over half of the women in the teenage group, breastfed their children. Accordingly, when the duration of breastfeeding was taken into account, the risk of cognitive deficits and emotional disorder shown by the children of young mothers was considerably reduced. In fact, after controlling for the duration of breastfeeding, the risk of emotional disorder shown by the children in the early twenties group, and the risk of cognitive deficits shown by the children in the teen mother group was reduced to non-significance. Thus, these findings are in line with those of previous studies (e.g. Kramer et al, 2008; Lucas et al, 1992) and suggest that intervention initiatives that focus on breastfeeding promotion would likely improve the developmental outcomes of children born to young mothers.

The other dimension of the postnatal environment that had an adverse effect upon children's cognitive development was the experience of being cared for by a mother who was suffering from depression. In particular, this was an experience significantly more likely to occur among the offspring of teenage mothers. Thus, when exposure to postnatal depression was taken into account, the difference in IQ scores between the children in the teen and older mother group was reduced to non-significance. Therefore, in the context of young motherhood, intervention initiatives that focus on the mother's mental health in the antenatal and postnatal period maybe fruitful in improving outcomes for mothers and children. However, recent research suggests that the treatment of the mother's illness does not necessarily improve the outcomes for the child (Forman et al, 2007). Thus, it is recommended that intervention initiatives for postpartum depression target the infants cognitive and

emotional functioning, the mother-infant relationship, as well as the mother's mental state (Forman et al, 2007).

4.4.4. The Post-Infancy Environment and Children's Cognitive and Emotional Outcomes

As mentioned previously, exposure to maternal depression during late childhood was found to be important in explaining the link between young motherhood and children's risk of emotional disorder. However, the degree of association between antenatal depression and subsequent episodes of maternal illness, coupled with the design and small sample size of the present study, renders the disentangling of effects problematic. Ideally, a genetically informative design that includes the detailed assessment of the child rearing environment, as well as the mother's mental state, is needed to assess the significance of exposure to maternal depression from the antenatal period and beyond. Nonetheless, in the current study, it is noteworthy that depression prior to the child's birth did not predict his or her risk for emotional disorder. Rather, exposure to maternal depression during pregnancy and late childhood were implicated. Thus antenatal factors, as well more proximal environmental processes (e.g. parenting practices) likely contribute to the risk of emotional disorder shown by the children of young mothers.

The experience of living with both biological parents at age 11 appeared initially both to protect against the development of an emotional disorder and to promote advances in children's cognitive development. However, when the simultaneous influence of alternate antenatal, postnatal and subsequent environment factors were considered, the importance of family structure diminished. For example, antenatal depression itself was a predictor of not living with both biological parents at

age 11, and when this association was taken into account, the effect of family structure on children's risk of emotional disorder was removed.

For children's cognitive functioning, key features of the pre-childbearing, antenatal, postnatal and subsequent environments were identified as contributors to the cognitive deficits shown by the children of young mothers. In particular, the mother's own intellectual ability, antenatal smoking, postpartum depression, the duration of breastfeeding and the number of siblings in the home were the main variables that reduced the magnitude of the between group differences to non-significance. Thus, these findings illustrate the need to examine the simultaneous influence of multiple sources of risk when examining the reasons why children born to young mothers experience an array of adverse outcomes.

4.4.5. Conclusions and Future Directions

A detailed discussion of the limitations of the current study and of the directions for future research is provided in the general discussion (chapter 6). To summarise, exposure to maternal depression in the antenatal and postnatal months appears to have different effects upon different domains of functioning. As such, the increased rates of perinatal depression experienced by young mothers partly accounts for the adverse cognitive and emotional outcomes shown by their children. However, the analyses contained in this chapter revealed that the effects of the mother's depression in part attenuate when other sources of risk and adversity are considered. Nonetheless, the identification of young mothers suffering from depression in pregnancy would likely lead to the detection of a group of women and their families most at risk of later problems. Thus, it is important to identify the factors that predispose young mothers to antenatal depression. In the absence of information

surrounding the women's actual transition to parenthood in the current sample, the penultimate chapter of this thesis seeks to further the findings of chapters 3 and 4 by examining the psychiatric, social background, relationship, contextual, and pregnancy-related factors that identify which young women become depressed in pregnancy. These analyses will be undertaken on a contemporary sample of first-time mothers who entered parenthood post 2005.

Chapter 5

EMPIRICAL STUDY 3

The Predictors of Antenatal Depression among Young Mothers and Their Use of Legal and Illegal Substances during Pregnancy:

A New Study of First-time Mothers

5.1. Introduction

The analyses contained in chapter 3 revealed that young mothers (both those who entered parenthood in their teenage and in their early twenties years) are at an increased risk of experiencing a depressive episode during pregnancy. The longitudinal assessment of the women's mental state over the 11 year period that followed the study child's birth revealed that the majority of young mothers with antenatal depression went on to experience subsequent episodes, both in the postpartum, and during their children's early childhood and middle childhood years. The increased prevalence of antenatal depression among the women who became mothers at young ages, along with the sub-optimal antenatal and postnatal environments that they provided, were then seen to partly account for the elevated rates of emotional disorder and cognitive deficits shown by their offspring (see chapter 4).

While it is evident from these analyses that both primiparous and multiparous women who begin childbearing in their teenage and early twenties years are at risk of antenatal depression, and that their first-born and later-born children are at risk of adverse outcomes, important information surrounding the women's actual transition to parenthood was not available for the mothers who were studied in chapters 3 and 4.

Thus, analyses of a new sample of first-time mothers were undertaken: (1) to examine whether the increased risk of antenatal depression shown by the teenage and early twenties mothers who were previously studied was replicated in a different sample of women who entered parenthood almost 2 decades later and (2) to study the psychiatric, social background, relationship, contextual, and pregnancy-related factors that characterise the circumstances of young mothers during their transition to parenthood, in order to identify the factors that predispose them to antenatal depression. The identification of the factors that give rise to depression during pregnancy will not only aid the detection and acceleration of treatment for the women, but will also highlight a group of children in the next generation who will likely experience a range of adverse outcomes.

5.1.2. Predisposing Factors to Antenatal Depression: The Adult Literature

Due to the paucity of research into the factors that predispose young mothers to depression during the antenatal months (see chapter 2), it is helpful to begin with studies in the adult literature that have sought to establish the aetiology of antenatal depression. An array of different psychosocial risk factors have been highlighted in both the psychiatric and the obstetric literatures as predisposing factors to antenatal depression. These include socio-demographic, circumstantial, relationship, pregnancy-related and genetic mechanisms. The evidence that bears on each of these broadly defined groups of risk factors will now be outlined.

The socio-demographic factors. Although many different indices of social background (e.g. socio-economic status, educational attainment, ethnicity, parity and maternal age) have been examined as predictors of antenatal depression, the evidence is somewhat inconsistent and contradictory. For example, in a large sample of 3,472

adult women who were screened for depressive symptoms whilst attending antenatal clinics across 10 different hospitals in the United States, low educational attainment and unemployment were found to predict depression status in pregnancy (Marcus et al, 2003). In that study, parity, ethnicity, and maternal age were found to be unrelated to depressive symptoms. However, it is noteworthy that Marcus and colleagues (2003) excluded teenage mothers from their sample, and in common with numerous other studies in the obstetric and psychiatric literatures (e.g. Gotlib, Whiffen, Wallace & Mount, 1991; Leigh & Milgrom, 2008), age at the time of the current pregnancy, rather than age at first birth, was the criterion variable.

Alternatively, some studies have found ethnicity (Bowen & Muhajarine, 2006; Rich-Edwards et al, 2006) but not educational attainment or socio-economic status (Da Costa et al, 2000; Gotlib et al, 1991; Leigh & Milgrom, 2008) to be associated with antenatal depression, whereas other studies have found educational attainment, socio-economic status, and age (Bolton et al, 1998; Rich-Edwards et al, 2006) but not ethnicity (Jesse et al, 2005) to predict antenatal depression. It is noteworthy that in the obstetric and psychiatric literatures, parity is rarely a significant predictor of depression status in pregnancy, and in the study that found young age to be associated with a high number of depressive symptoms (Rich-Edwards et al, 2006), the effect of age disappeared after the influence of financial hardship and the lack of a partner were taken into account. Thus, while the literature on the socio-demographic predictors of antenatal depression is mixed, there is evidence that educational attainment, ethnicity and socio-economic status predict antenatal depression. The contradictory findings on the socio-demographic predictors of depression in pregnancy may reflect the different sampling and methodological approaches used in the studies cited.

Factors related to the pregnancy and women's current circumstances. In

relation to factors concurrent to the pregnancy, high scores on 'current life event scales' along with specific negative circumstances have been consistently implicated in the aetiology of antenatal depression (Da Costa et al, 2000; Leigh & Milgrom, 2008; Rich-Edwards et al, 2006; Rubertsson, Wickberg, Gustavasson, & Radestad, 2005). In particular, women experiencing financial problems and those who are dissatisfied with their housing conditions have been found to be more vulnerable to depression during the antenatal period (Kitamura, Shima, Sugawara & Toda, 1993; Kitamura et al 1996; Rich-Edwards et al, 2006).

Additionally, factors specific to the pregnancy have also been highlighted. In particular, symptoms of physical illness such as back ache, fatigue and severe morning sickness have been found to be associated with a high number of depressive symptoms (Chou et al, 2003; O'Brien & Newton, 1991; Reeves et al, 2001). Nevertheless, in these studies, it unclear whether the depressive symptoms preceded or were subsequent to the occurrence of physical illness. Finally, there is some evidence that a history of miscarriage and an unplanned pregnancy are risk factors for antenatal depression (Larsson, Sydsjo, & Josefsson, 2004; Martin, Brown, Goldberg & Brockington, 1989; Zuckerman et al, 1987). However, the evidence that bears on these risk factors is inconsistent as other studies fail to replicate these associations (Da Costa et al, 2000; Leigh & Milgrom, 2008)

Interpersonal relationships and social support. In general, women are thought to be more vulnerable to depression when they perceive themselves to have poor quality social support (Brugha et al, 1982). Of particular relevance are studies that find an association between unsatisfactory levels of social support, the absence of a partner, and antenatal depression (Jesse et al, 2005; Milgrom & Leigh, 2008; Rich-

Edwards et al, 2006; Westdahl et al, 2007). More specifically, of the numerous domains of social support that have been studied (e.g. practical, financial, advice), the evidence suggests that substandard emotional support from both partners and parents (particularly mothers) is of special relevance to the occurrence of antenatal depression (Condon & Corkindale, 1997; Pajulo, Savonlahti, Sourander, Helenius, & Piha, 2001; Rahman, Iqbal, & Harrington, 2003). In particular, the presence of serious relationship difficulties with the child's biological father, as indexed by frequent arguments and relationship breakdown, has been linked with an increased risk of depression during pregnancy (Dimmitrovsky, Perez-Hirshberg & Itskowitz, 1987; Kumar & Robson, 1984; Rich-Edwards et al, 2006).

Genetic influences. Evidence for depression having a strong genetic basis is accumulating (Goldberg, 2006). A large Australian study of monozygotic and dizygotic twins estimated genetic factors to explain between 25-38% of the variance in postpartum depression (Treloar, Martin, Bucholz, Madden, & Heath, 1999). There is significant association between antenatal and postnatal depression, particularly among young mothers (see chapter 3). To my knowledge however, genetically informative designs in the context of antenatal depression are yet to be established. Nonetheless, women with a personal history of affect disorder have been shown to be at risk of depression during pregnancy (Cohen et al, 2006; Felice, Saliba, Greeh & Cox, 2004; Rich-Edwards et al, 2006; Kumar and Robson, 1984; also see chapter 3). What is more, women whose parents have a psychiatric illness are at elevated risk of antenatal depression (Felice et al, 2004). However, replication of this finding is needed as few studies have examined a parental history of psychiatric illness as a risk factor for antenatal depression in the next generation. Nevertheless, when studying the

factors that predispose young mothers to antenatal depression, personal and parental psychiatric history needs to be taken into consideration.

5.1.3. *Predisposing Factors to Antenatal Depression: The Young Mother Literature*

As mentioned previously, there is a dearth of research into the factors that predict antenatal depression among young mothers. However, factors that predispose young mothers to postnatal depression have been examined. In line with the adult literature, social class, ethnic minority status, and an increase in 'current life event stress' has been found to be associated with postnatal depressive symptoms among young mothers (Leadbeater & Linares, 1992; Esbaugh, 2006; Secco et al, 2007). Similarly, young mothers who report a conflictual relationship with their own parents have been found to display higher rates of postnatal depression (Birkeland et al, 2005; Caldwell, Antonucci, Jackson, Wolford & Osofsky, 1997). Furthermore, echoing the findings in the adult literature, being single or having a conflictual relationship with the child's father has been linked with an increase in depressive symptoms (Barnett et al, 1996; Leadbeater & Linares, 1992). Thus, the psycho-social risk factors of postnatal depression among young mothers are markedly similar to the predictors of antenatal depression among older mothers.

It is evident from the review of the literature into the factors that predispose adult mothers to antenatal depression that few studies consider the importance of characteristics that are more proximal to the individual. In particular, comorbidity between affect disorder, substance abuse, and a propensity to antisocial behaviour is overlooked in the obstetric and psychiatric literatures. Researchers interested in the field of developmental psychopathology have highlighted a higher incidence of

teenage parenthood among adolescents with a history of disruptive behaviour

(Bardone et al 1996; Kovacs et al, 1994; Woodward & Fergusson, 1999).

Additionally, studies derived from the same literature have documented higher rates of affect disorder and legal and illegal substance use among both teenage mothers and adolescents who score highly on measures of disruptive behaviour (Bardone et al, 1998; Fergusson & Woodward, 2000; Romano et al, 2006; Zuckerman et al, 1989).

While very few studies (if any), have examined the pregnancies of women with a history of behavioural problems, the well replicated association between disruptive behaviour, affect disorder and teenage pregnancy leads to the hypothesis that women with a childhood history of behavioural problems could be at greater risk of antenatal depression. What is more, the documented associations between disruptive behaviour, teenage parenthood and antenatal depression highlight the need to consider legal and illegal substance use among women presenting with a mental illness.

5.1.4. The Aims of the Current Chapter

The first core aim of the current chapter is to examine the risk of antenatal depression among a contemporary sample of first time mothers. For these analyses, the prevalence rates of antenatal depression among teenage and early twenties mothers will be contrasted with those of adult mothers. In doing this, detailed information on the women's experience of treatment is also presented. In addition, in order to build upon and further past research, information related to the prevalence of antenatal anxiety disorders and their association with depressive disorders is also provided. Furthermore, in relation to comorbidity, and in light of the association between teenage parenthood, disruptive behaviour and substance use, the second core aim of the current chapter is to examine the use of both legal and illegal substances

among young mothers. What is more, the findings of chapter 4 emphasise the importance of examining antenatal substance use among young mothers. In these analyses, the antenatal substance use of teenage and early twenties mothers will be contrasted with that of older mothers. Following this, the prevalence of both legal and illegal substance use among the young mothers with and without antenatal depression will then be contrasted. Following this, the third core aim of this chapter is to examine the psychiatric, social background, circumstantial, relationship, and pregnancy-related factors that characterise the circumstances of young mothers during their transition to parenthood. These analyses will seek to identify which young women are most likely to become depressed during the antenatal months.

5.2. Method

5.2.1. *The Participants*

The women participated in the Cardiff Child Development Study (CCDS), a prospective longitudinal study of first time parents and their children. Between 1st November 2005 and 31st July 2007, women were recruited from hospital and general practice antenatal clinics across the South Wales area. The catchment areas that the antenatal clinics served were selected to provide a diverse sample of families. To increase the representativeness of the sample¹⁵, a further midwifery team that supported vulnerably housed families recruited participants into the study. In the UK, all women attend the maternity ward of their local hospital for their 12 and 20 week scans. After the initial phase of recruitment, it was apparent that the general practice antenatal clinics tended to serve multiparous women. Thus, recruitment focused on antenatal clinics held in four different hospitals across the local NHS trusts. In

¹⁵ Unlike the sampling frame used in the South London Child Development Study, the ethics committee that approved the Cardiff Child Development Study prohibited access to the names and addresses of all first-time parents in the population from which the sample was drawn.

addition, recruitment continued with the midwifery team that supported vulnerably housed women.

Trained researchers approached all primiparous women attending the antenatal clinics. The clinic receptionists helped identify primiparous women. The researchers approached the women, and, if present, their partners, and told them about the study. As a recruitment aid, a short DVD that described all of the study procedures could be used. Following the verbal and/or video description of the study, women were given a leaflet that detailed the aims and methodology of the research. At this stage, women who expressed interest in the study were asked to provide contact details so that the project administrator could phone them 1-2 weeks after the initial contact. The role of the project administrator was to provide further information about the study procedures, after which, the families decided whether or not to participate. If families were reluctant to provide their contact details but expressed interest, a stamped addressed envelope upon which they could provide their details was offered.

If families agreed to participate, an appointment was made for the antenatal interview in the third trimester of pregnancy. No exclusion criteria were used for the study, except miscarriage or infant death. Translators were employed to enable participation among those whose native language was other than English or Welsh, and those who had impaired hearing. The present analyses focus on the first 220 participants who entered the study and completed the first assessment.

Characteristics of the sample are presented in Table 5.1. In many ways, the sample is representative of the UK and regional population. The age at first birth for the women in the current sample is almost identical to the UK average of 27.6 years (Office of National Statistics, 2006, Table 1.6). The ethnic composition of the current sample is in line with the population from which it was drawn, where 92.6% of people

define themselves as White British (Office of National Statistics, 2006). What is more, the ethnic composition of the current sample is in line with the UK average, where 92.1% of people define themselves as White British (Office of National Statistics, 2006). In terms of the mother's marital status at the birth, the sample is comparable to the Welsh and the UK average, where 53% (Welsh Assembly Government, 2006) and 56% (Office of National Statistics, 2006) of births occur outside of marriage.

5.2.2. Procedure

All of the study procedures were approved by the Ethics committee of the School of Psychology Cardiff University and the Multi-Centre Research Ethics Committee for Wales which serves the NHS. After complete description of the study, written informed consent was obtained from the participants. In addition, participants provided consent for an audio-recording of the interview to be made. The recording of the interview was required to ensure accuracy when the researchers coded the interview data. A multi-method, cross-sectional design was adopted. Interview and questionnaire methods were used.

The antenatal assessment. Research assistants who held a first degree in psychology interviewed the women, when at home, during the third trimester of pregnancy ($M = 30.7$ weeks gestation, $SD = 4.5$, range, 26 to 40 weeks). If the participant was in a relationship with the child's biological father, then he was interviewed by a second research assistant. If the mother was single, attempts were also made to interview the child's biological father. For the purposes of the current analyses, only the mother's interview data were evaluated for clinical diagnoses.

Table 5.1: Characteristics of the Mothers and their Environment (N = 220)¹⁶

	Maternal Age Group			Sample (N=220)
	≤19 (N=39)	20-22 (N=28)	23+ (N=153)	
Age at First Birth	18.4 (0.9)	21.2 (0.8)	31.0 (4.4)	27.5 (6.5)
White British Origin (%)	97.4	96.4	91.4	93.1
Married to Child's Father at Birth (%)	2.6	3.6	66.0	46.8
Single at Child's Birth (%)	28.2	10.7	3.9	9.1
No maternal qualifications (%)	74.4	46.4	11.1	26.8
Working Class (%)	97.4	82.1	35.9	52.7
Living with Child's Father (%)	30.8	67.9	94.1	79.5
Owner Occupied (%)	20.5	21.4	75.8	59.1
In Receipt of Benefits* (%)	71.8	53.6	7.2	24.5

All interviewers underwent training in the use of the Schedules for Clinical Assessment in Neuropsychiatry, a set of instruments validated in assessing, measuring, and classifying the symptoms of major psychiatric disorders (SCAN; Wing et al, 1990). Training for the interviewers took place at the University Hospital of Wales, a certified SCAN training centre. For the purposes of the longitudinal study, which sought to examine the normal range of variation with respect to emotional and physical health in pregnancy, all participants were required to answer the questions that related to all of the symptoms of affective disorder, regardless of whether or not they screened into a particular section of the SCAN. Women were asked to report on their mood state from the time of conception to the day of the third trimester interview. Participants also provided information about the presence or absence of major psychiatric disorders prior to the conception. Within each of the SCAN modules that covered the different psychiatric disorders, details at the symptom level

¹⁶ Ns vary slightly, between 216-220 because of missing data on some variables

were provided and coded for participant's worst episode of illness. Additionally, participants provided information about their past experience of mental health-related consultations with a general practitioner and/or another psychiatric service professional.

In addition to the assessment of clinically significant psychopathology, the semi-structured interview yielded information about educational attainment, work history, anti-social behaviour and family psychiatric history. During the home visit, the women also completed the Arizona Social Support Interview Schedule (ASSIS: Barrea, 1983). On average, the interviews lasted approximately 2 hours. After the interview had been completed, women and, if present, their partners, were asked to complete a questionnaire and to return it to the University in a stamped, addressed envelope. A date for return was written on the top of each questionnaire and a telephone and e-mail contact was made available for participants to use if they required assistance in completing the questionnaire. As well as obtaining a host of socio-demographic information, the questionnaire asked about the participants' relationship status, fertility history, current life events, history of disruptive behaviour and legal and illegal substance use (smoking, consumption of alcohol, and illegal drugs). Participants received a small remuneration in the form of a £20 gift voucher for their participation at this stage of the study.

5.2.3. Measures of Maternal Age, Psychopathology and Substance Use

Maternal childbearing age. An algorithm was constructed in the EXCEL spreadsheet package that took into account the mother's date of birth and the study child's date of birth to calculate the mother's age at first birth. Maternal age at first birth was then recorded in whole years and to the nearest month. Based upon their age

at first birth, mothers were classified into three, theoretically and socially, meaningful maternal age groups (see chapter 3). The categorisation of participants into maternal age groups was based upon the existing literature, and upon national norms. The age groups are as follows: (1) mothers aged 19 and under (*teenage mothers*); (2) mothers aged between 20 and 22 (*early twenties mothers*); and mothers aged 23 and over (*older mothers*). For the purposes of consistency and replication, the age group definitions in the current study are analogous to those of Studies 1 and 2. Please see Study 1 (pages 59 – 60) for further justification of the age group definitions.

Antenatal affective disorder. Information about the presence or absence of clinically significant affective disorder was obtained via the SCAN (Wing et al, 1990). The SCAN has been developed under the auspices of the World Health Organisation (WHO) as a comprehensive instrument for the assessment and classification of the major psychiatric disorders (WHO, 1994). The method of interviewing in the SCAN, although systematic and standardised, is flexible; it depends upon the detailed questioning of the participant to enable the interviewer to judge whether a symptom is present, and if so, with what severity. Interviewers were trained to rate the presence and degree of severity of all symptoms of affective disorder that are defined in the SCAN glossary. The presence and degree of severity of each symptom was rated in its own right, and independent of its relevance to any possible diagnoses that may or may not apply to the participant. However, if a participant identified a period of depressed or anxious mood, then each of the symptoms in the relevant SCAN module were rated only in the context of this affective disturbance. For example, if a participant reported depressed mood and sleep problems during the pregnancy, but the sleep problems did not occur when the participant was feeling depressed, then they were scored as a zero on the sleep items.

To avoid over-diagnosis, the somatic symptoms of affective disorder as assessed on the SCAN were operationalised further. Because being pregnant is very often associated with extreme tiredness, appetite changes and weight gain, the fatigue, appetite, weight gain/ weight loss and sleep items were more specifically defined and when appropriate, 'down rated'. What is more, under the guidance of the consultant perinatal psychiatrist on the team (Dr Ian Jones), additional questions were added to the SCAN interview schedule to help disentangle the somatic symptoms of affective disorder from those of pregnancy. To help determine if symptoms were primarily attributable to the physical state of being pregnant, women were asked if their mood state and the symptom covaried. For example, if sleep disturbance was present, women were asked if it was related to *urination, being uncomfortable, the baby kicking*, or indeed if it was related to *worry and/or rumination*. Furthermore, participants were asked whether the sleep disturbance was present before and after the alteration in mood.

A second example would be the modification of the weight gain/weight loss and appetite items. Loss of appetite was not coded as clinically significant if it was attributable to morning sickness, whereas it was coded as clinically significant if there was evidence that it was related to depressed mood and anxiety. Likewise, weight gain of 2 stone was not coded as the presence of a symptom of psychopathology, whereas excessive weight gain (3 stone or more) was coded as clinically significant if there was evidence that the weight gain was partly attributable to excessive eating in the context of depressed mood. The additional questions that were added to the SCAN interview schedule and the modified rating scales with operational definitions helped clarify these distinctions. Furthermore, the consultant perinatal psychiatrist on the team provided researchers with on-going training on their interview techniques to

help disentangle the somatic symptoms of affective disorder from those of pregnancy. In addition, regular team meetings were held to help ensure that the interviewers were calibrated on their coding of the symptoms.

After each interview, the research assistants transcribed the psychiatric information and coded the presence or absence of symptoms according to the glossary and rating scales provided with the SCAN¹⁷ (Wing et al, 1990). Each participant who reported the presence of clinically significant symptoms of psychopathology (both during the pregnancy and prior to the conception) was presented to one of two consultant psychiatrists during monthly case conference meetings. The coded transcript was reviewed by the psychiatrist and the diagnostic decision was made according to the criteria set forth in the Diagnostic and Statistical Manual of Mental Disorders, Text Revised (DSM-IV-TR; American Psychiatric Association, 2000). The transcripts contained the participant's direct responses to the questions. When required, the psychiatrist(s) asked additional questions of the interviewers to aid their decision, e.g. Did the participant's affect appear flat? Was there observable evidence of psychomotor agitation/retardation?

If a researcher deemed a participant to have no psychopathology, past or present, then a second researcher reviewed the written summary to confirm the decision. All participants where minimal psychopathology was deemed to be present were brought to case conference for the attention of the psychiatrist. In addition, a random sample of 20 interviews where the researchers deemed no psychopathology to be present were brought to case conference. In 100% of the 20 randomly chosen interviews, the psychiatrist agreed that a clinically significant disorder was not present. Furthermore, inter-rater reliability was calculated between the 2 psychiatrists

¹⁷ See the measures section for modifications that were made to the interview schedule and rating scales to help disentangle the somatic symptoms of pregnancy from those of affect disorder.

on a 10% random sample of interviews ($N = 22$). There was significant overall agreement for the pregnancy diagnoses, $\kappa = .78, p < .001$. Similarly, there was significant overall agreement for the past diagnoses, $\kappa = .76, p < .002$.

Based on the psychiatrist's decision, a dichotomous variable was created that measured whether or not the mother had met DSM-IV-TR criteria for a clinically significant depressive disorder during pregnancy (American Psychiatric Association, 2000). Likewise, a dichotomous variable was created to detail whether or not the mother had met DSM-IV-TR criteria for an anxiety disorder (*e.g. generalised anxiety disorder, panic disorder, anxiety not otherwise specified*) during the pregnancy. To supplement the dichotomous variables, a depression symptom scale was generated by adding up the ratings women were given on the 9 DSM-IV symptoms of major depressive disorder. Similarly, an anxiety symptom scale was generated by adding up the ratings on the 7 DSM-IV symptoms of generalised anxiety disorder. In addition, based on the information provided during the SCAN interview, a number of clinical descriptor variables were created. For each episode of affective disturbance, the onset, offset and duration of each episode was coded. Similarly, the women's experience of treatment and medication was also documented.

Prior history of affect disorder. Information about the presence or absence of clinically significant affect disorder prior to the pregnancy was obtained via the SCAN (Wing et al, 1990). Women were asked to report on the lifetime presence or absence of depressive and anxiety disorders prior to the child's conception. If more than one depressive episode was reported, onset, offset and treatment information was asked about each episode. However, details on the women's experience of depressive symptoms were only obtained for the worst episode. Similarly, for each of the anxiety disorders (*e.g. panic disorder, generalised anxiety disorder, anxiety disorder not*

otherwise specified, substance induced anxiety disorder) onset, offset, and treatment information was obtained for each episode. However, if more than one episode was reported for each of the anxiety disorders, details on the women's experience of symptoms was only obtained for their worst episode of each anxiety disorder. The same diagnostic case conference procedures that were used for the classification of antenatal depressive and anxiety disorders were followed for the past history of affect disorders. Based on the psychiatrist's decision, a dichotomous variable was created which detailed whether or not the mother had met DSM-IV criteria for an affective disorder prior to the child's conception.

Prior history of disruptive behaviour. As part of questionnaire, mothers were asked to report on their childhood and adolescent history of disruptive behaviour, by retrospectively completing a well-established measure of symptoms of childhood disorder, the Strengths and Difficulties Questionnaire (Goodman, 1997). For present purposes, the 5-item conduct problem scale of the SDQ was expanded to include 7 of the core DSM-IV symptoms of conduct disorder, whereas the 5-item SDQ hyperactivity scale was used to assess the mothers' past symptoms of ADHD. For the conduct scale, the items of property damage and truancy from school were added to the 5 original items (*anger & temper tantrums, disobedience, often initiates fights, lying and cheating and property theft*). The retrospective reports on the 12 item disruptive behaviour scale, which included conduct and ADHD symptoms showed acceptable levels of internal consistency $\alpha = .82$, comparable to those found for children's and adolescents' own reports on the SDQ (Hay & Pawlby, 2003; also see chapter 4).

The participant's own parents' psychiatric history. As part of the SCAN interview, participants were asked to report whether or not their biological mother and

father had suffered from a mental health problem. If a parent was reported to have suffered from a mental health problem, information about the nature of the illness and the experience of treatment was obtained. A dichotomous variable was created that detailed whether or not the participant's mother and/or father had suffered from a mental health problem.

Legal substances. Women were asked to report in the questionnaire whether or not they had smoked cigarettes and/or drunk alcohol during the pregnancy, and if so, they were asked to specify how many cigarettes they had smoked per day and how many units of alcohol they had drunk per week. Additionally, this information was specified by trimester. Two dichotomous variables were created that detailed whether or not the women had smoked cigarettes and whether or not she had drunk alcohol. The dichotomous measures were supplemented with information on the timing of the cigarette smoking and alcohol drinking.

Illegal substances. The Adolescent Drug Involvement Scale (Moberg & Hahn, 1991) was used to enquire about illegal substance use. In the current study, the scale was modified to enable women to report on their use of a range of illegal substances by trimester. From the information provided, a dichotomous variable was created to detail whether or not the women had smoked cannabis during the pregnancy. In addition, a dichotomous variable was created that detailed whether or not class A drugs (cocaine, ecstasy and speed) had been taken. No participant reported the use of other class A drugs (e.g. heroin, LSD, crack-cocaine). The dichotomous measures were supplemented with the information on the frequency and timing of the drug taking by trimester of pregnancy.

5.2.3.1. *Social Background Measures Examined as Predictors of Antenatal Depression*

Mother's educational qualifications. Mothers were asked to report their educational attainment during the antenatal interview. Based on the information provided a dichotomous variable was created. Women were classified as having at least 5 G.C.S.Es or the equivalent CSE or 'O' level at grade C or above versus having no educational qualifications or very basic qualifications, e.g. NVQs or less than 5 G.C.S.Es or the equivalent CSE or 'O' level at grade C or above.

Social background. Social class was determined using the Standard Occupational Classification 2000 (SOC2000: Elias, McKnight & Kinshott, 1999). The highest ranked employment that the mother ever had was used to determine the mother's socioeconomic status. A dichotomous variable was created that classified mothers as either working or middle class. In the UK, the SOC2000 has replaced the Goldthorpe and Hope classification scheme that was used in chapters 3 and 4.

Ethnicity. A dichotomous variable was created that classified the women as either of white British origin or other (see Table 5.1).

5.2.3.2. *Pregnancy-Related Measures Examined as Predictors of Antenatal Depression*

Prior history of miscarriage. As part of the fertility history section of the questionnaire, women were asked to specify whether or not they had had a miscarriage prior to the current pregnancy. A dichotomous variable was created that detailed whether or not the participant had experienced a miscarriage prior to the study pregnancy.

Unplanned pregnancy. As part of the fertility history section of the questionnaire, women were asked to specify whether the pregnancy was planned or unplanned. A dichotomous variable was created which detailed whether the pregnancy was planned or unplanned.

Life events. To ensure that a comprehensive assessment of recent life events was made, the scales developed by Barnett and colleagues (1983) and Brugha and colleagues (1985) were combined. The scale developed by Brugha and colleagues (1985) focuses on 12 life threatening experiences. In contrast, the scale developed by Barnett and colleagues covers 36 general and pregnancy specific events. In the present study, a 47 item scale was constructed. Participants were required to specify whether or not a given event had occurred and if it had, they were asked to rate on a 3 point scale how distressing they had perceived the event to be. As with the original scales, a total distress score can be computed by summing the participant's distress ratings across all items. For the purposes of the current study, the total distress score is used.

Physical symptoms and illness. The checklist of the common physical illnesses and symptoms of pregnancy (e.g. urinary tract infections, heartburn, backache) used in the Avon Longitudinal Study of Parents and Children (ALSPAC) was adapted for the purposes of the current study. The adapted version enabled women to report whether or not they had experienced each illness or symptom during each trimester of pregnancy. For the purposes of the current analyses, a composite measure of the total number of physical illnesses or symptoms was created.

Morning sickness. As part of the questionnaire package, participants were asked to specify whether or not they had experienced morning sickness. If present, women were then asked to rate how severe they perceived their morning sickness to

be. A dichotomous variable was created that detailed whether the morning sickness was moderate to severe versus mild to nil.

5.2.3.3. *Current Circumstance Measures Examined as Predictors of Antenatal Depression*

Dissatisfaction with housing. Participants were asked to rate whether or not they were satisfied with their housing conditions. A dichotomous variable was created that detailed whether or not the participant was satisfied versus dissatisfied with her housing.

Financial problems. Participants were asked to rate whether or not they were experiencing financial problems. A dichotomous variable was created that detailed whether or not the women were experiencing financial problems.

5.2.3.4. *Relationship Measures Examined as Predictors of Antenatal Depression*

Emotional support from the participant's parents and the child's father.

Participants completed the Arizona Social Support Interview Schedule (ASSIS: Barrea, 1983). The ASSIS is a semi-structured interview that assesses six types of social support (material aid, positive feedback, practical help, advice, emotional support and social participation). During the interview, participants were asked to detail all persons in their social network and they were then asked to specify whether or not each of the network members had provided each type of support during the pregnancy. For the purposes of the present study, three dichotomous variables were created that detailed whether or not the child's father, and whether or not the participant's own biological mother and father had provided emotional support during the pregnancy.

Single parenthood. Women specified their relationship status in the questionnaire. A dichotomous variable was created that detailed whether or not the participant was single or in a relationship with the child's father.

Serious relationship difficulties. As part of the life events questionnaire, women were asked to specify whether or not they had experienced serious arguments with the child's biological father and whether or not they had experienced irreconcilable differences that ended in a separation. A dichotomous variable was created that detailed whether or not the participant had experienced serious relationship difficulties, as indexed by serious arguments and/or a separation.

5.2.4. Data Analyses

Distributions were examined for normality and linearity. Where continuous variables were found not to follow the Gaussian distribution, transformations took place following the guidelines of Tabachnick and Fidell (2001). Between group differences on the categorical outcome measures (e.g. antenatal depression, smoking, alcohol, and cannabis use in pregnancy) were compared with the Pearson chi-squared test of independence. In all age group comparisons, women in the older mother age group served as the reference category. Where linear trends between the mother's age at first birth and dichotomous outcomes were observed, the Mantel-Haenszel chi-square test of linear associations is reported. If the analysis violated the assumptions of the chi-square test, the results of the Fischer's exact test are reported. For continuous measures, between group differences were examined using univariate analysis of variance tests (ANOVA). The Tukey HSD test was used to follow up any significant ANOVA results. In all analyses, significance was judged at the $p < .05$ level, but trends up to $p < .10$ are also identified.

The second aim of this chapter was to examine the predictors of antenatal depression among young mothers. Depending on the distributional properties of the relevant variables, the significance of interrelations between antenatal depression and the psychiatric, social background, circumstantial, relationship, and pregnancy-related factors that have been found in the adult literature to predict depression during pregnancy were examined with Pearson's or Spearman's correlation coefficient. Variables that showed a significant association with antenatal depression at the univariate level were further examined with logistic regression. This method allows for the examination of the association of each independent variable to the outcome variable after controlling for all other variables in the equation. Thus, the influence of each variable on the outcome measure (antenatal depression) is calculated above and beyond every other variable in the equation (Tabachnik and Fidell, 2001). For the multivariate analyses, model and individual variable statistics are presented along with odds ratios for significant factors.

5.3. Results

5.3.1. The Prevalence and Nature of Affective Disorder during Pregnancy

Of the 220 women who entered the study, 39 were in the teenage mother group (19 years and under), 28 were in the early twenties group (20 to 22 years), and 153 were in the older mother group (23 and older). During the pregnancy, 48 of 220 women (21.8%) met DSM-IV criteria for a clinically significant affective disorder, the vast majority of whom were diagnosed with major depressive disorder. Of the women with an affective disorder, 83% (40/48) were classified as suffering with a depressive disorder and 17% (8/48) were classified as having an anxiety disorder. For

the women judged to be suffering from a clinically significant depressive disorder, 26 (65%) were diagnosed with major depressive disorder (MDD) single episode, 13 were diagnosed with recurrent MDD, and 1 woman was classified as suffering from an adjustment disorder with depressed mood (American Psychiatric Association, 2000).

Only 3 of the women with antenatal depression reported suffering from their illness at the time of the conception. Thus, for the majority of women with antenatal depression (93%), their episode began during the pregnancy. It is noteworthy that for most women (69%), their depressive episode began during the first trimester of pregnancy; for the remaining women (31%), their depressive episode was reported to begin during the second trimester. On average, the women reported that their current episode of depression had lasted for 17.3 weeks ($SD = 20.20$, range = 2 to 116). However, it is important to note that 13 (33%) of the women with depression were still in episode at the time of the antenatal interview. Thus, for these women, the duration of their depressive episode is an underestimation.

For the 8 women diagnosed with an anxiety disorder, 7 were classified as having generalised anxiety disorder and 1 woman was diagnosed with an anxiety disorder not otherwise specified. In addition, 23% (9/40) of the women with a depressive disorder had a comorbid anxiety disorder diagnosis. Of these 9 women, 6 were classified with generalised anxiety disorder, 3 with panic disorder, and 1 woman was diagnosed with an anxiety disorder not otherwise specified. All of the women with an anxiety disorder reported that their illness began during the first trimester of pregnancy. However, due to the insufficient number of women diagnosed with an antenatal anxiety disorder¹⁸, subsequent analyses that compare the women in the

¹⁸ Due to the small cell sizes, the assumptions of the chi-square analysis that compared the women in the different maternal age groups on the outcome variable, a diagnosis of only an anxiety disorder, were violated; 7.7% (3/39) of teenage mothers, 0% (0/28) of early twenties mothers, and 3.3% (5/153) of older mothers met this criteria. Similarly, the assumptions of the chi-square analysis that compared

different maternal age groups will focus on the more prevalent clinical disorder, depression. However, as was the case with the SLCDS sample (see chapter 3), it is important to note that anxiety symptoms were a predominant feature of the women's depressive illness, irrespective of whether they met criteria for a comorbid depressive and anxiety disorder. For example, a composite measure of anxiety symptoms was created from the 7 major symptoms of generalized anxiety disorder specified in DSM-IV (American Psychiatric Association, 2000). Women diagnosed with a depressive disorder reported significantly more symptoms of anxiety than the women not diagnosed with a depressive disorder¹⁹ $M = 9.80$ ($SD = 3.59$) v. $M = 4.78$ ($SD = 3.21$), $F_{(1,218)} = 75.83, p < .001$. The anxiety scale showed acceptable levels of internal consistency, $\alpha = .81$.

5.3.2. Age Group Differences in the Prevalence Rates of Antenatal Depression

The prevalence rates of antenatal depression for the women in the different age groups are reported in Table 5.2. As can be seen, a significant effect of maternal age group was observed. Teenage mothers were over 16 times as likely as the women in the older mother age group to be suffering from depression during pregnancy, $\chi^2(1) = 49.96, p < .001$, OR = 16.84, CI = 6.71 - 42.29. Similarly, mothers in their early twenties were over 10 times as likely as the women in the older mother age group to be suffering from antenatal depression, $\chi^2(1) = 26.87, p < .001$, OR = 10.35, CI = 3.76 - 28.55. Thus, corroborating the findings of chapter 3, women who begin

the women in the different maternal age groups on the outcome variable, a diagnosis of an anxiety disorder including women with comorbid depression was also violated. 20.5% (8/39) of teenage mothers, 10.7% (3/28) of early twenties mothers, and 3.9% (6/153) of older mothers met this criteria.

¹⁹ The analysis was repeated excluding the women with a comorbid anxiety disorder diagnosis from the depressed group, the results were unchanged, $M = 9.16$ ($SD = 3.70$) v. $M = 4.78$ ($SD = 3.21$), $F(1,209) = 47.02, p < .001$.

childbearing during their teenage and early twenties years are at a heightened risk of experiencing a depressive episode during pregnancy.

Table 5.2. Prevalence Rates of Antenatal Depression for the Women in the Different Maternal Age Groups

	Maternal Age Group				Test Statistics
	≤19 (N=39)	20-22 (N=28)	23+ (N=153)	Sample (N=220)	
Antenatal Depression (%)	51.3	39.3	5.9	18.2	$\chi^2 (2) = 52.67, p < .001$ -----
Number with depression	20	11	9	40	

5.3.3. The Symptom Profiles for the Women in the Different Age Groups who were Diagnosed with Antenatal Depression

The symptom profiles of the women in the different age groups who were diagnosed with antenatal depression are reported in Figures 5.1 to 5.3. It is noteworthy that the women in the different age groups who were diagnosed with antenatal depression were not markedly different in their symptom profiles (see Figures 5.1 to 5.3). In line with this observation, the women in the different age groups who were diagnosed with antenatal depression were not significantly different in their experience of any of the individual cognitive, affective and somatic symptoms detailed in the graphs. In order to provide more detail on severity, a depression symptom scale was created by summing the ratings given for the 9 DSM-IV symptoms of major depressive disorder. The women in the different age groups who were diagnosed with antenatal depression were not significantly different in their total symptom score, $F_{(2, 37)} = 2.29$, $p = .12$. For the depression symptom scale, the mean score for the teenage mothers was $M = 10.5$, for the early twenties mothers, $M = 12.8$, and for the older mothers $M = 11.0$. Thus, among the women in the different age groups with antenatal depression, there were no significant differences in the presentation or severity of the symptoms.

Nevertheless, while it is important to examine associations between anxiety and depressive symptoms among women diagnosed with antenatal depression, it is also important to examine another source of comorbidity; namely, the association between antenatal depression and legal and illegal substance use.

Figure 5.1. The Somatic Symptoms of Anxiety and Depression among the Women with Antenatal Depression: Proportions by Age Group

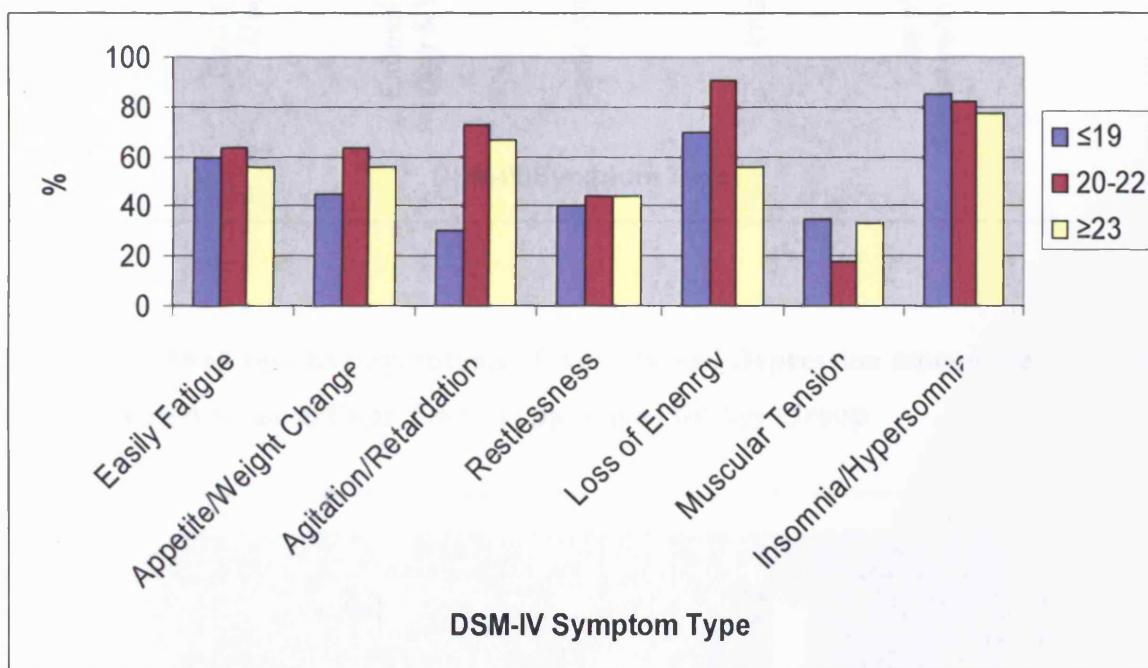


Figure 5.2. The Affective Symptoms of Anxiety and Depression among the Women with Antenatal Depression: Proportions by Age Group

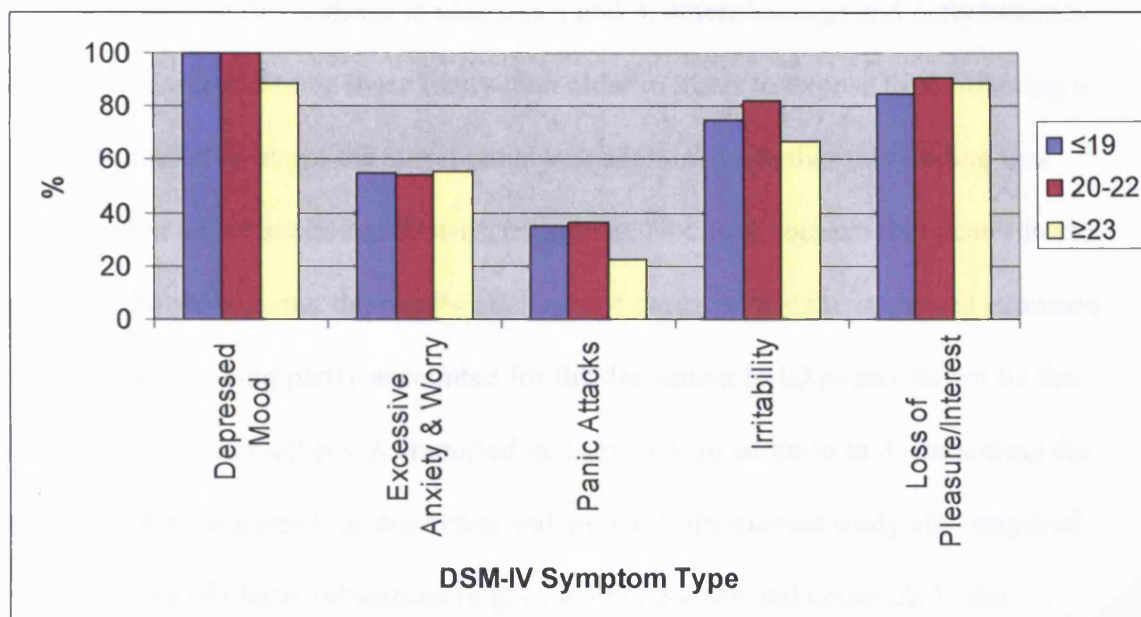
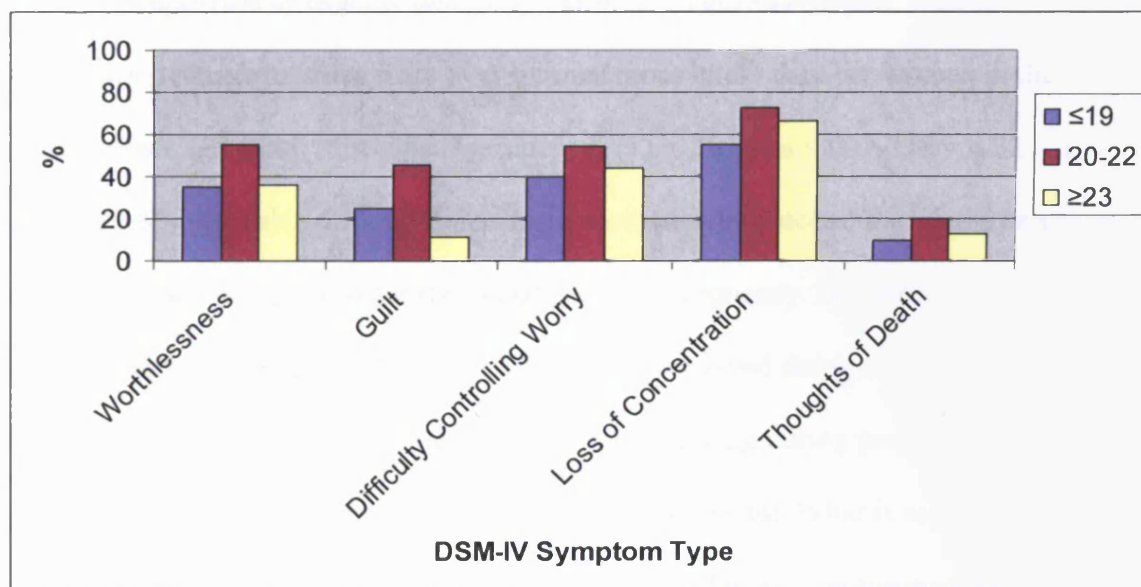


Figure 5.3. The Cognitive Symptoms of Anxiety and Depression among the Women with Antenatal Depression: Proportions by Age Group



5.3.4. Legal and Illegal Substance Use during Pregnancy among the Women in the Different Maternal Age Groups

In light of the findings in chapters 3 and 4, where teenage and early twenties mothers were found to be more likely than older mothers to expose their offspring to cigarette smoke in utero, the current analyses examined whether this finding was replicated in a new sample of first-time mothers. Not only does smoking carry health risks for the women, but the results of chapter 4 revealed that the increased exposure to antenatal smoking partly accounted for the decrement in IQ points shown by the children of young mothers. As reported in Table 5.3, in addition to documenting the use of legal substances (e.g. cigarettes and alcohol), the current study also enquired about the use of illegal substances (e.g. cannabis, ecstasy and cocaine). In the subsequent sections, comparisons between teenage and older mothers in their use of legal and illegal substances will be presented first. The analogous comparisons between the early twenties and older mothers will then follow.

Comparison of teenage and older mothers: Legal substances. During pregnancy, teenage mothers were over 6 times more likely than the women in the older mother age group to smoke cigarettes, $\chi^2 (1) = 25.31, p < .001$, OR = 6.32, CI = 2.93 – 13.60 (see Table 5.3). Of the teenage mothers who smoked during the antenatal months, 91% (20/22) did so for the majority of the pregnancy. In contrast, of the older mothers who smoked cigarettes, only 44% (13/27) reported doing so for the duration of the pregnancy. All of the women who gave up smoking during pregnancy claimed to do so shortly after they found out that they were pregnant. What is more, a significant effect of maternal age group was observed for the average number of cigarettes smoked per day, $F_{(2, 64)} = 6.31, p < .01$. Post hoc analyses revealed that among the women who smoked, the teenage mothers reported smoking significantly

more cigarettes per day than the older mothers, $M = 8.3$ ($SD = 3.9$) vs. $M = 3.8$ ($SD = 3.6$) respectively.

With regards to alcohol, and in line with the findings reported in chapters 3 and 4, it was the older mothers who were the most likely to consume alcoholic beverages when pregnant. Older mothers were over 2 times more likely than the women in the teen mother group to drink alcohol during pregnancy, $\chi^2(1) = 3.98$, $p < .05$, $OR = 2.10$, $CI = 1.00 - 4.43$ (see Table 5.3). On average, older mothers reported drinking a mean of 2.33 ($SD = 3.45$) units of alcohol a week; which would equate to 2 small of glasses of wine or 2 pints of beer. Of the older mothers who drank alcohol, 86% reported doing so in two or more trimesters. In contrast, teenage mothers drank a mean of 4.23 ($SD = 6.15$) units of alcohol per week. However, only 46% of the teen mothers reported drinking alcohol in 2 or more trimesters of pregnancy. The comparison between the teen and older mothers who drank alcohol during pregnancy in terms of the average number of units drank per week was non-significant.

Comparison of teenage and older mothers: Illegal substances. Only 4 mothers reported using class A drugs during pregnancy, 2 of whom were teenagers and 2 of whom were in the older mother age group. Women took either ecstasy, speed, or cocaine, or a combination of the three. All of the women who reported taking class A drugs reported doing so only during the first trimester. The insufficient number of women who took class A drugs prohibited further age group analyses on this measure (see Table 5.3). For cannabis use, teenage mothers were almost 4 times as likely as older mothers to smoke cannabis when pregnant, $\chi^2(1) = 5.83$, $p < .03$, $OR = 3.83$, $CI = 1.21 - 12.17$ (see Table 5.3). Of the 6 teenage mothers who smoked cannabis, 4 (67%) reported doing so on a weekly basis for the majority of the pregnancy, whereas for the older mothers, 6 out of the 7 cannabis smokers (86%)

claimed to quit their use after the first trimester. The majority of women who declared a cessation in their cannabis smoking after the first trimester reported doing so after finding out that they were pregnant.

Table 5.3. Prevalence of Legal and Illegal Substance use During Pregnancy for the Women in the Different Maternal Age Groups

	Maternal Age Group			Sample (N=220)	Test Statistics
	≤19 (N=39)	20-22 (N=28)	≥ 23 (N=153)		
Drank Alcohol (%)	34.2	26.9	52.3	46.0	$\chi^2(2) = 8.36, p < .02$
Smoked Cigarettes (%)	57.9	69.2	17.9	31.2	$\chi^2(2) = 42.64, p < .001$
Smoked Cannabis (%)	15.8	11.5	4.7	7.5	$\chi^2(2) = 6.14, p < .02$
Took Class A Drugs (%)	2.6	0.0	2.0	1.9	$\chi^2(2) = 0.63, p = .73^*$

*Assumptions of Chi-square test were violated due to the small number of women who took class A drugs

Comparison of early twenties and older mothers: Legal substances. During pregnancy, women in their early twenties were over 10 times more likely than the mothers in the older age group to smoke cigarettes, $\chi^2(1) = 30.85, p < .001$, OR = 10.33, CI = 4.07 – 26.22 (see Table 5.3). Of the early twenties mothers who smoked during the antenatal months, 87% (15/18) did so for the duration of the pregnancy. In contrast, the majority of older mothers (56%) who smoked during pregnancy claimed to give up after the first trimester. On average, the mothers in their early twenties smoked a mean of 8.3 ($SD = 7.5$) cigarettes per day. As reported earlier, the older mothers smoked a mean of 3.8 ($SD = 3.6$) cigarettes per day. Post-hoc analyses revealed that this difference was significant ($p < .02$). It is noteworthy that the mothers in the teenage and early twenties age group were not significantly different in the number of cigarettes smoked per day.

As shown in Table 5.3, it was the women in the older mother age group who were the most likely to drink alcohol during pregnancy. Older mothers were almost 3 times more likely than the mothers in their early twenties to drink alcohol during

pregnancy, $\chi^2 (1) = 5.73$, $p < .02$, OR = 2.98, CI = 1.18–7.50 (see Table 5.3).

However, as reported in the previous section, the mean number of alcoholic units drunk per week by the older mothers was modest ($M = 2.33$), and in line with the clinical guidelines of 1 to 2 units, once or twice a week (Royal College of Obstetrics and Gynaecology, 2008). Mothers in their early twenties who drank alcohol during pregnancy consumed a mean of 2.7 units per week. Older mothers and the women in their early twenties who drank alcohol during pregnancy did not differ in their weekly number of units.

Comparison of early twenties and older mothers: Illegal substances. As shown in Table 5.3, none of the early twenties mothers took class A drugs during pregnancy. However, as mentioned previously, the insufficient number of women who took class A drugs prohibited further age group analyses. For cannabis use, early twenties mothers were over 2 times as likely as older mothers to smoke cannabis when pregnant. However, this comparison was not significant, $\chi^2 (1) = 1.95$, $p = .16$, OR = 2.67, CI = 0.64 – 11.05. Of the mothers in their early twenties who smoked cannabis, only one woman reported using the drug on a weekly basis for the duration of the pregnancy. Accordingly, the majority of women in their early twenties who smoked reported quitting their substance use shortly after they found out that they were pregnant.

5.3.5. Are the Young Mothers Who Were Depressed in Pregnancy More Likely than the Non-Depressed Young Mothers to Use Legal and Illegal Substances?

Given that the majority of women who used legal and illegal substances were in both young mother groups, and that both groups of young mothers are at risk of antenatal depression, it is important to examine the comorbidity between antenatal

depression and substance use among young mothers. Due to the limited number of women who took class A drugs in the pregnancy, analyses focus on alcohol, cigarette and cannabis use. Young mothers who were depressed in pregnancy were no more likely than young mothers who were not depressed to have smoked cigarettes or to have drunk alcohol (see Table 5.4). In contrast, young mothers who were depressed in pregnancy were significantly more likely than the young mothers who were not depressed to have smoked cannabis, OR = 12.00, CI = 1.40 –102.78. Thus, the identification of young women suffering from antenatal depression would likely lead to the detection of a group of mothers who themselves, and their infants, are at added risk because of their cannabis use. Consequently, subsequent analyses will focus on identifying the factors that give rise to antenatal depression among young mothers.

Table 5.4. Prevalence of Legal and Illegal Substance use among the Young Mothers Who Were and Were Not Depressed in Pregnancy

	Depressed (N = 31)	Non-Depressed (N = 36)	Test Statistics
Drank alcohol (%)	30.0	32.4	$\chi^2(1) = 0.04, p = .84$
Smoked cigarette (%)	62.1	62.9	$\chi^2(1) = 0.01, p = .95$
Smoking cannabis (%)	26.7	2.9	$\chi^2(1) = 7.42, p < .01$

5.3.6. The Predictors of Antenatal Depression among Young Mothers

The factors examined as the predictors of antenatal depression among young mothers are depicted in Tables 5.5 and 5.6. As shown in Table 5.5, mothers suffering with antenatal depression were significantly more likely than the women not suffering with antenatal depression to have a prior history of affective disorder and disruptive behaviour, to have a parent who themselves had suffered from a mental illness, to be dissatisfied with their housing conditions, and to have experienced serious relationship difficulties during the pregnancy. None of the pregnancy, social background or social support-related measures that have been found in past research

to predict antenatal depression among adult mothers were predictive of depression status among the young mothers (see Table 5.6). As such, only the measures that were significantly associated with antenatal depression ($p < .05$) were entered into the regression analyses

Table 5.5. The Social, Relationship, Pregnancy and Contextual Factors of Young Mothers Who Were and Were Not Depressed in Pregnancy^a

	Depressed (N = 31)	Non-Depressed (N = 36)	Test Statistics
Psychiatric history			
Parental psychiatric history (%)	54.8	16.7	$\chi^2(1) = 10.77, p < .001$
Prior affective disorder (%)	51.6	19.4	$\chi^2(1) = 7.65, p < .01$
Disruptive behaviour (Mean: SD)	10.7 (4.6)	7.9 (4.3)	$F_{(1, 63)} = 6.15, p < .02$
Social Background			
Low educational attainment (%)	71.0	55.6	$\chi^2(1) = 1.69, p = .19$
Working class (%)	93.5	88.9	$\chi^2(1) = 0.44, p = .51$
Non-White UK	0.0	100.0	$\chi^2(1) = 1.83, p = .18$
Pregnancy			
Previous miscarriage (%)	20.0	8.6	$\chi^2(1) = 1.77, p = .18$
Unplanned pregnancy (%)	71.0	75.0	$\chi^2(1) = 0.04, p = .84$
Negative life events (Mean: SD)	11.5 (6.9)	9.7 (7.2)	$F_{(1, 61)} = 0.92, p = .34$
Physical symptoms/illness (Mean: SD)	4.8 (2.9)	3.8 (1.9)	$F_{(1, 61)} = 2.15, p = .15$
Moderate/severe morning sickness (%)	51.6	44.4	$\chi^2(1) = 0.34, p = .56$
Contextual			
Dissatisfaction with housing (%)	38.7	13.9	$\chi^2(1) = 5.42, p < .02$
Financial problems (%)	77.4	72.2	$\chi^2(1) = 0.24, p = .63$
Relationship			
Single	25.8	16.7	$\chi^2(1) = 0.84, p = .36$
Lack of maternal emotional support (%)	26.7	38.9	$\chi^2(1) = 1.10, p = .29$
Lack of paternal emotional support (%)	93.1	97.2	$\chi^2(1) = 0.62, p = .43$
Lack of partner emotional support (%)	36.7	41.7	$\chi^2(1) = 0.17, p = .68$
Serious relationship difficulties (%)	67.7	36.1	$\chi^2(1) = 6.67, p < .01$

^a The Ns for individual items vary slightly because of missing data

Table 5.6. Inter-correlations among Antenatal Depression and the Social, Relationship, Pregnancy and Contextual Factors of Young Mothers

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Antenatal depression	-----																		
2. Past affective disorder	.34**	-----																	
3. Parental PPH	.40***	.14	-----																
4. Disruptive behaviour	.30**	.31**	.29**	-----															
5. Low education	.16†	-.09	.17†	.41***	-----														
6. Working class	.08	-.10	.04	.02	.08	-----													
7. Ethnicity	.04	-.06	.13	.00	.05	.12	-----												
8. Previous miscarriage	.17 †	-.01	.09	.06	.12	.25*	.19†	-----											
9. Unplanned pregnancy	-.05	.08	.01	.04	.09	-.07	.09	-.25*	-----										
10. Negative life events	.12	.14	.04	.23*	.04	.06	-.12	-.14	.14	-----									
11. Physical symptoms	.19†	.18†	.19†	-.07	-.14	-.19†	.06	-.17†	.11	-.06	-----								
12. Morning sickness	.07	.06	.01	-.23*	-.07	.30**	-.01	.23*	-.30**	.01	.13	-----							
13. Single	.11	-.06	.02	.04	.17†	.03	-.14	-.08	.06	.02	-.25*	-.12	-----						
14. Housing dissatisfaction	.28**	.01	.08	.10	.10	.06	.10	-.23*	.08	.20†	-.11	.06	.12	-----					
15. Financial problems	.06	.21*	-.01	.29**	.19†	.30**	-.10	-.02	-.02	.29**	-.08	.15	.05	.18	-----				
16. Lack of maternal ES	.13	.11	.16†	.06	-.07	-.11	-.13	-.09	.22*	.05	-.15	-.11	.21*	.05	-.03	-----			
17. Lack of partner ES	.05	.01	.04	-.18†	-.09	.15	.04	.22*	-.08	-.09	.30**	.26**	-.49***	-.23*	-.09	-.04	-----		
18. Lack of paternal ES	.10	-.01	.01	.19†	-.29	-.18†	.04	.12	-.03	-.08	-.02	-.06	-.12	-.13	-.05	-.01	.17†	-----	
19. Relationship difficulties	.35**	.25*	.08	.25*	.13	.01	-.18†	-.05	.03	.57***	-.08	-.04	.20†	.08	.13	-.04	-.01	-.08	-----

N = 67. † p < .10 *p<.05. **p<.01. ***p <.001

Holding all other factors constant, young women with a parent who had suffered from a mental illness were 6.3 more likely than women without a parental history of mental illness to have antenatal depression. Put the other way, 73.9% of the young mothers who had at least one parent with a psychiatric history became depressed in pregnancy. Similarly, young mothers who themselves had a history of affective disorder were 3.8 times more likely than women without a psychiatric history to develop depression during pregnancy. Again, put the other way, 69.6% of young mothers diagnosed with a past history of affective disorder became depressed in pregnancy. Moreover, women who experienced serious relationship difficulties during the pregnancy and women who were dissatisfied with their housing conditions²⁰ were significantly more likely to suffer from depression during the antenatal months (OR = 3.9 and 5.0 respectively). When the simultaneous influence of the factors that were significantly associated with antenatal depression were considered, a past history of disruptive behaviour was no longer a significant predictor of antenatal depression. Thus, this measure is not reported in the final model. The overall chi-square for the model was significant, the ratio of variables to participants was appropriate, and the residuals and goodness-of-fit indicators revealed that the final model showed good fit to the data (see Table 5.7).

²⁰ It was important to examine the source of the dissatisfaction with the housing conditions further. Women who were depressed in pregnancy were no more likely to be living with their parents, to be living with their partner, or to be living alone. Likewise, women who were dissatisfied with their housing conditions were no more likely to be living with their parents, to be living with their partner, or to be living alone. Similarly, living in a flat or hostel versus a house was unrelated to depression status. However, the women who were dissatisfied with their housing were more likely to be living in a hostel or flat.

Table 5.7. Significant Predictors of Antenatal Depression among Young Mothers

	β (SE)	Wald	95% CI for EXP(B)		
			Lower	EXP(B)	Upper
Included					
Constant	-2.37 (0.63)	13.98	----	0.09	----
Parental history of mental illness**	1.84 (0.66)	7.67	1.71	6.27	22.99
Past history of affective disorder*	1.33 (0.65)	4.17	1.05	3.77	13.50
Dissatisfaction with housing*	1.36 (0.63)	4.70	1.17	4.95	21.03
Serious relationship difficulties*	1.36 (0.63)	4.70	1.12	3.88	13.43

Note: R-squared = .34 (Cox & Snell) .45 (Nagelkerke); Model χ^2 (4) = 27.66, $p < .001$.

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

5.3.3. Consultations with the Primary Care Team among the Women Suffering from

Antenatal Depression

Given that approximately 1 in 2 teenage and early twenties mothers suffered from antenatal depression, it is important to ascertain the proportion of women who sought help from their GP and/or their midwife for their illness. Of the women suffering from antenatal depression, 60% (24/40) sought help from the primary care team for their condition. Half of the teenage mothers (10/20), 73% of the early twenties mothers (8/11) and 67% of the older mothers consulted their GP and/or midwife about their illness. The between group comparison with regards to whether or not the women sought help for their illness was non-significant.

Two of the women who sought help for their mental health problem (5%) were placed on psychotropic medication and 6 (15%) were referred onto the primary care counselling service. Only 4 women (10%) were referred onto secondary psychiatric services. Thus, just over 1 in 4 women classified as depressed according to DSM-IV criteria were actively treated for their illness. This is true for both young and older mothers alike; 26% of young mothers and 33% of older mothers were prescribed medication and/or psychotherapy to help them manage their illness. At the anecdotal level, many of the women who consulted a member of their primary care team about

their mental health problem expressed dissatisfaction with the service. Indeed, many women commented that their GP was reluctant to provide psychotropic medication because of the lack of research into the effects that such drugs have on the developing child. Additionally, many of the mothers who did not consult their GP or midwife commented that this was because they found the primary care team to be unsupportive or unavailable. These sentiments are expressed in the vignettes presented on the following pages. It is important to note that the vignettes have been anonymised and all identifiable information has been removed.

Vignette One

Rhianon: Diagnosed with recurrent major depressive disorder and panic disorder during the pregnancy. Rhianon is of a middle class background.

Rhianon is 21 years old and living with her child's biological father. She has a history of depression and anxiety and she reported suffering from an eating disorder during adolescence. Rhianon commented that her past mental health problems led to her dropping out of a prestigious University before she completed her degree. She presented as intelligent, self-aware and reflective. Both of her parents have suffered with mental health problems. Rhianon witnessed her father being sectioned under the mental health act and she reported that his admission to the psychiatric unit worsened his condition. As a result of her past experiences, Rhianon is reluctant to take psychotropic medication. As an alternative, she prefers to read self-help books to help her understand and manage her emotions. However, she felt that counselling or psychotherapy would have been helpful during the pregnancy. Rhianon went on to comment:

‘I’ve been a bit disappointed with my midwife appointments, when you’re pregnant with your first baby it’s special to you...they brush you off and if you’ve got questions and things they say don’t worry and it’s not a big deal... they are quite important questions and things that should be taken seriously... I’ve not been impressed with them at all, they seem really busy and stressed...I understand (they’re busy) but it’s difficult as it’s horrible to go there and feel squashed afterward, I did get upset about one of my appointments, like they weren’t interested, not hugely impressed with the service but it’s not their fault. I don’t think they’ve got the time for one on one chats.....’

Vignette Two

Sian: Diagnosed with recurrent major depressive disorder during pregnancy. Sian was herself the daughter of a teenage mother.

Sian is 19 years old and in unstable relationship with the child's biological father; she reports serious arguments that have led to temporary break ups during the pregnancy. She is currently living in a hostel for young mothers and she was 'thrown out' of her parental home after she told her mother that she was pregnant. Prior to becoming pregnant, Sian had suffered from depression and anxiety and was prescribed anti-depressants by her GP. She has never been offered counselling or a psychological intervention. Sian reported that her mother had long suffered with depression.

She reported first feeling depressed around the time that she found out that she was pregnant. Recently, she reported being pre-occupied with thoughts of her partner being unfaithful and with thoughts of him becoming the victim of a terrorist attack. On the night before the interview, Sian reported not being able to sleep until she knew that her partner was alive and well; he had been to London visiting friends the previous day. Sian scored in the clinical range on all of the symptoms of depression and anxiety and her worries were described as 'sticking in her head like an annoying little person'. Sian informed her midwife of her symptoms and was told that it 'is normal and because of her hormones'. She has not informed her GP, I asked her why? Sian replied 'because they all say the same thing.....that you're depressed'. Sian went on to comment that she didn't want to speak to her GP as she didn't want to take anti-depressants because the last time she took them 'they made her feel worse'. Sian also smoked cigarettes and cannabis during the pregnancy.

5.4. Discussion

The analyses conducted on this contemporary sample of first time mothers revealed that almost one in two women who entered parenthood during their adolescent and early twenties years were depressed in pregnancy. Most (74%) were not receiving any form of treatment during this vulnerable time, despite having consulted a member of the primary care team about their illness. Mirroring the findings of chapter 3, the majority of women diagnosed with an antenatal affective disorder were suffering from depression; although it is important to highlight that a substantial number of women with depression were also suffering with anxiety, regardless of whether or not they met diagnostic criteria for a comorbid anxiety and depressive disorder diagnosis. These findings are consistent with other studies that have documented significant association between antenatal depression and anxiety (Austin, Tully, & Parker, 2007; Heron et al, 2004; Kelly, Russo, & Katon, 2001). However, the prevalence rates of antenatal depression among the young mothers in this sample are almost twice those reported in previous research (e.g. Rich-Edwards et al, 2005; Troutman & Cutrona, 1990); reasons behind such differences will be alluded to in the general discussion. Nevertheless, the findings reported in the current Chapter strengthen the claims made in Chapter 3, that among young mothers, antenatal depression is a highly prevalent disorder, which often goes undetected, and untreated.

Whilst the high prevalence of antenatal depression among the young mothers is striking, so too is their use of legal and illegal substances. Of particular concern is the finding that approximately two in every three teenage and early twenties mothers smoked cigarettes during pregnancy, while one in every six teenage mothers, and one in every eight early twenties mothers smoked cannabis. The depressed young mothers were no more likely than the non-depressed young mothers to smoke cigarettes, but

they were more likely to smoke cannabis. The direction of effects between cannabis smoking and antenatal depression can not be determined in the current sample. It is however noteworthy that research outside of the perinatal and young mother literatures has demonstrated a causal link between cannabis smoking and mood disorder (Bovasso, 2001; Patton et al, 2002; Thomas, 1996). However, to the contrary, other studies fail to find a causal link, but interpret the use of cannabis as ‘self-medicating’ behaviour among persons already suffering from depression (Musty & Kaback, 1995; Paton, Kessler, & Kandel, 1977).

The high prevalence of cigarette smoking during pregnancy among the young mothers in this sample is somewhat consistent with past research (Captuto & Bordin, 2007; Cornelius et al, 2007). However, the prevalence of antenatal smoking among the young mothers in the current sample is rather higher than the 21% and 46% rates reported by Captuto & Bordin, (2007) and Cornelius and colleagues (2007). Similarly, the prevalence of antenatal cannabis use among the young mothers in this sample aligns with the rates reported in other studies. For example, Frank et al, (1990) report the prevalence of cannabis use among pregnant adolescents at 12%, while Barros et al (2006) report a rate of just 4.6%. What is clear from these comparisons, and from the comparisons on antenatal depression, is that the young mothers in this sample are at the high end of the antenatal risk continuum; this applies to both mothers in their teenage years and those in their early twenties.

The analyses that examined the predictors of antenatal depression among the young mothers revealed both consistencies and inconsistencies with the findings derived from samples of adult mothers. Most notably was the result that the broad socio-demographic measures of the environment (e.g. social class, educational attainment and ethnicity) that have been found to be predictive of antenatal depression

among adult mothers did not discriminate between the young mothers who were and who were not depressed. Instead, analyses drew attention to specific characteristics of the mother's current circumstances, and their own, and their parents' psychiatric history. Evidence in line with genetic hypotheses of the aetiology of affect disorder is provided by the finding that 73.9% of young women with a parent who has a history of mental illness became depressed in pregnancy. Likewise, 69.6% of young women who have a personal history of affect disorder were diagnosed with antenatal depression. However, it should be noted that these findings do not, of course, prove that genes are the underlying mechanism of these associations—families can be similar because of the effect of the shared environment (Rutter, Moffitt & Caspi, 2006), and environmental as well as genetic factors have been implicated in the aetiology of affective disorders (Goldberg, 2006).

Among the young mothers, specific rather than global indices of life event stress were found to predict the occurrence of antenatal depression. Young women who were dissatisfied with their housing conditions showed an increased prevalence of antenatal depression. The source of the housing dissatisfaction appeared less to do with who the mother lived with, but more to do with the nature of the housing conditions. The young women who reported dissatisfaction with their housing were more likely to be living in a flat or a hostel than the women who were not dissatisfied. This finding is consistent with the results of a Japanese study which documented a higher prevalence of antenatal depression among women who were reported being unhappy with the conditions of their housing (Kitamura et al, 1993).

Furthermore, in line with findings derived from samples of older mothers (e.g. Dimmitrovsky et al, 1987; Rich-Edwards et al, 2006), the young women who experienced serious relationship difficulties during the pregnancy—as indexed by a

separation or serious arguments, showed an increased prevalence of antenatal depression. However, due to the cross sectional nature of current study, the bi-directional nature of the relationship between depression and serious problems in the couple relationship cannot be disentangled. Nonetheless, the knowledge that antenatal depression is more prevalent among women who have experienced relationship problems during pregnancy could serve as a marker of risk for members of the midwifery and obstetric team. However, in contrast to past research (e.g. Condon & Corkindale, 1997; Pajulo et al, 2001), the other relationship measures examined as predictors of antenatal depression (e.g. single parenthood and unsatisfactory emotional support from a partner and parents) were not found to distinguish depressed from non-depressed young mothers.

The young mothers in the current study who were diagnosed with antenatal depression were no more likely than the young women without the diagnosis to report physical ill health, an unplanned pregnancy, a history of miscarriage, or severe morning sickness. These findings are somewhat consistent with past research as not all studies find that these measures predict antenatal depression (e.g. Da Costa et al, 2000; Kumar & Robson, 1984; Leigh & Milgrom, 2008). However, it should also be noted that non-significant trends between a history of miscarriage, a greater number of symptoms of physical ill health and antenatal depression were observed in the current study. Based on the magnitude of the correlations, it is likely that these associations would reach the level of significance in larger samples.

To summarise, the findings of the current study have confirmed an increased prevalence of antenatal depression and substance use among women who enter parenthood during their teenage and early twenties years. What is more, the current study has extended past research by examining the factors that predispose young

mothers to antenatal depression, recognising the fact that not all young women are vulnerable to mental illness during this major life course transition. Nonetheless, the current study is not without its limitations. The constraints of the current study, along with the implications of the findings and the suggestions for future research will be outlined in the final chapter of this thesis.

Chapter 6

GENERAL DISCUSSION

6.1. *Aims of the Thesis*

Central to this thesis was the examination of the prevalence, severity, and longitudinal course of the mental problems experienced by women who entered parenthood as adolescents and during their early twenties. In particular, special focus was given to the occurrence of depression and anxiety during the antenatal and postnatal months, where it was hypothesised that young mothers would be at a heightened risk of developing a clinically significant mental health problem. As well as studying the psychological functioning of young mothers, I sought to examine the long term implications that an early transition to parenthood has for the ontogeny of children. Through the use of a prospective longitudinal design, this thesis sought to test whether any increased risk of cognitive, behavioural or emotional problems shown by the offspring of young mothers could be accounted for by exposure to their mother's mental health problems. When addressing this question, this thesis examined the differential effects of exposure to maternal depression at different stages of the child's development, and a host of alternate explanations were also considered. The current chapter presents a synthesis of the key empirical findings of this thesis. The limitations and main conclusions of each study will be outlined, and the implications of the findings for future research, theory and practice will be discussed.

6.2. *The Mental Health Problems Experienced by Women who Entered Parenthood as Adolescents and during their Early Twenties: Summary of Key Findings*

The analyses contained in chapter 3 revealed that over the course of the 12 year study period, almost 3 in every 4 young mothers (*both those who entered parenthood in their teenage and in their early twenties years*) experienced at least 1 episode of depression. However, among the young mothers studied in chapter 3, particular time periods represented heightened sources of risk. First and foremost, analyses drew attention to the fact that relative to older mothers, women who entered parenthood during their teenage and early twenties years were particularly vulnerable to depression during pregnancy. During the antenatal months, over a third of the teenage and early twenties mothers were depressed, and the majority went on to experience subsequent episodes. Relative to the women who delayed parenthood, the young mothers were depressed during a greater number of time periods during their child's lifetime. At each assessment point, depressive disorders were far more prevalent than anxiety disorders.

The inclusion of multiparous as well as primiparous mothers in the study reported in chapter 3 highlights the fact that women who enter parenthood in adolescence, or in their early twenties, are at risk of depression in subsequent pregnancies, as well as during their first. Thus, women who make their transition to parenthood at a young age, but who are not necessarily young at the time of a later pregnancy are also at risk. However, whilst the findings of chapter 3 were informative, the mixed parity design meant that detailed information surrounding the women's actual transition to parenthood was not available for all women. Thus, in order to confirm and to further the findings observed in the first empirical chapter, a second sample of first-time mothers was recruited.

The analyses contained in chapter 5 confirmed that women who entered parenthood during adolescence and during the early twenties are at an increased risk of antenatal depression. Almost 1 in 2 of the young women studied in chapter 5 were depressed during pregnancy. In their analysis of 2 different cohorts of young mothers born 10 years apart, Maughan & Lindelow (1997) found evidence for secular change in the psychosocial risks associated with teen parenthood. In particular, the risk of psychiatric morbidity was found to be greater in the later cohort. The higher prevalence of antenatal depression observed in the more contemporary sample of young mothers studied in this thesis is in line with this finding. What is more, the fact that the prevalence of antenatal depression among the older mothers studied in chapter 5 was far lower than that observed among the older mothers studied in chapter 3 supports this claim. Nonetheless, the fact that the mothers in the recent cohort were drawn from a different population to the mothers in chapter 3 inhibits the ability to draw direct comparisons and firm conclusions.

The sample prevalence rate of antenatal depression reported in chapter 3 is somewhat higher than the estimates observed in much of the literature (see chapter 2). Similarly, the prevalence of depression during the child's lifetime is also comparatively high. A number of factors may account for such high rates. As discussed in chapter 2, many past studies into the prevalence of antenatal depression have excluded women of low socio-economic status, young mothers, and women with a recent history of psychiatric disorder. In chapter 3, no exclusion criteria were used, and the women were for the most part drawn from working class communities. It is likely that these factors contributed to the high prevalence rates of depression reported in this thesis. It is noteworthy that when the meta-analysis cited in chapter 2 was repeated on only mothers drawn from low socio-economic groups, the reported

estimates of 28% and 25% are very similar to the rates observed in chapter 3 (Bennett et al, 2004). It is reassuring that the 18.2% prevalence of antenatal depression reported in a new representative sample of first-time mothers (chapter 5) is almost identical to the pooled estimate of 18.4% derived from the meta-analysis reported by Bennett and colleagues (2004).

Several factors may explain the high prevalence rates reported in chapter 3. Firstly, and as mentioned above, the socio-economic composition of the sample likely contributes to the high rates. Secondly, life-time prevalence estimates derived from one wave epidemiological studies are increasingly being recognised as underestimates (see Moffitt et al, 2007a, Moffitt et al, 2007b; Pawlby et al, 2008). In chapter 3, repeated assessments of the women's mental health were made over a 12 year period and a high retention rate was achieved in that sample. Accordingly, the design and methodological strengths of the South London Child Development Study likely contribute to the high prevalence estimates. It is notable that the cumulative prevalence estimates of depression and other psychiatric disorders derived from other prospective longitudinal designs are producing estimates beyond those obtained from one wave epidemiological surveys (Angst et al, 2005; Moffitt et al 2007a; Moffitt et al, 2007b). Thus, the factors mentioned above, and the likelihood of a secular trend in the risks associated with an early transition to parenthood may account for the high prevalence rates of depression observed among the young mothers studied in chapters 3 and 5.

Whilst the prevalence of antenatal depression among the young mothers studied in chapter 5 was higher than that observed in chapter 3, so too was the occurrence of antenatal smoking. Again, this finding is consistent with the claim that the risks associated with teenage parenthood are greater among recent cohorts of

adolescent mothers (Maughan & Lindelow, 1997; Moffitt et al, 2002). However, the analyses in chapter 5 on the use of cigarettes during pregnancy also drew attention to the antenatal health risks taken by women who become mothers in their early twenties. Whilst the teenage and early twenties mothers were not significantly different in their antenatal use of cigarettes, a greater number of women in the early twenties age group engaged in smoking during pregnancy. Almost 6 in every 10 teenage mothers, and 7 in every 10 early twenties mothers smoked during pregnancy. Evidence of consistency across samples is provided by the finding that 1 in every 2 teenage and early twenties mothers studied in chapters 3 and 4 smoked during pregnancy. These figures are alarming when one considers the body of evidence that has linked antenatal smoking to an array of adverse child outcomes (e.g. Olds, 1997; Wakschlag & Hans, 2002).

As well engaging in the use of cigarettes, a sizable proportion of the young mothers studied in chapter 5 smoked cannabis during pregnancy. Sixteen percent of the teenage mothers, 12% of the early twenties mothers and 5% of the older mothers engaged in the use of cannabis at some point during the antenatal months. Moreover, while the majority of cannabis smokers in the early twenties and older mother age groups reported a cessation in their substance use around the time that they found out that they were pregnant, the majority of teenage mothers (67%) reported smoking cannabis for the duration of the pregnancy.

Whilst the small number of cannabis smokers in the overall sample renders caution in the interpretation of these results, the relatively high prevalence of cannabis use during pregnancy among young mothers, particularly teenage mothers, is of concern in light of the research which has linked antenatal cannabis use with suboptimal child outcomes (Barros et al, 2006; Goldschmidt, Day & Richardson,

2002; Huizink & Mulder, 2006). Nevertheless, due to the fact the antenatal risk behaviours of cigarette smoking, cannabis use, and alcoholic binge drinking cluster together (see Huizink & Mulder, 2006), large samples are needed to tease apart the differential effects of exposure to these various teratogens during foetal development. Furthermore, the analyses contained in this thesis make clear that in such studies, antenatal depression, as well substance use, needs to be considered.

In light of both the high prevalence of antenatal depression, and the fact that exposure to maternal depression during foetal life partly accounted for the adverse outcomes of children born to young mothers (chapter 4), the analyses on the second sample of first-time mothers sought to identify the factors that would help identify which young women become depressed in pregnancy. In contrast to the research on adult mothers, which has highlighted broad socio-economic measures of the environment (e.g. social class, educational attainment and ethnicity), the results of chapter 5 drew attention to specific characteristics of the mother's current circumstances, and her own, and her parents' psychiatric history. Evidence in line with genetic hypotheses of the aetiology of affect disorder is provided by the finding that 74% of the young women with a biological parent who has a history of mental illness became depressed in pregnancy. Likewise, 70% of women with a personal history of affect disorder were diagnosed with antenatal depression. However, as mentioned in chapter 5, these findings do not prove that genes are the cause of antenatal depression as families are similar because of the shared environment (Rutter et al, 2006), and genetically informative designs consistently highlight the complex interplay between genetic and environmental factors (Kendler et al, 1995; Rutter & Silberg, 2002).

In addition to the personal and parental psychiatric history predictors of antenatal depression, the findings of chapter 5 highlighted the importance of two specific indices of environmental adversity. Young women who were dissatisfied with their housing conditions and those who had experienced serious relationship difficulties were at elevated risk of becoming depressed during pregnancy. However, because the analyses reported in chapter 5 were cross-sectional, the bi-directional relationship between serious problems in the couple relationship and antenatal depression cannot be disentangled. Similarly, the association between housing dissatisfaction and depression may reflect a negativity bias in the women's perceptions of their environment rather than a causal association. However, the women who reported a dissatisfaction with their housing were more likely to be living in cramped conditions (e.g. a flat or hostel) and, at the anecdotal level, the standard of the accommodation that many of the young women with antenatal depression lived in was observably poor. Thus, it is likely that this finding does have a basis in actual experience.

6.3. The Long-term Cognitive, Behavioural and Emotional Outcomes of Children

Born to Young Mothers: Summary of Key Findings

The analyses contained in chapter 4 revealed that relative to the children of older mothers, it was the offspring born to women who entered parenthood during their early twenties who showed the greatest deficits in their cognitive functioning and the highest risk of developing a clinically significant emotional disorder. Thus, contrary to past research, offspring of teenage mothers were not the most at risk in terms of their mother's age at entry to parenthood. Nevertheless, the children who were born to teenage mothers did show small, but significant deficits in their

cognitive functioning and a slight, though non-significant increased risk of emotional disorder. It is likely that in a larger sample, the magnitude of the difference between the children born to teenage and older mothers in terms of the risk of emotional disorder would reach the level of significance. In addition, it is important to note that whilst an association between young motherhood and emotional disorder in offspring was observed, age group differences across the normative range of emotional problems, as measured by the SDQ, were not found. These findings highlight the fact that not all children born to young mothers experience emotional problems. Rather, these results point to the existence of a sub-group of children born to young mothers that is at risk.

In contrast to past research, the children of teenage and early twenties mothers were not found to be at risk of behavioural problems, nor did they demonstrate a higher prevalence of more serious patterns of disruptive behaviour. This discrepancy with previous studies could be explained by the fact that in other samples, young maternal age is more heavily confounded with indices of socio-economic status, and when this confound is taken into account, the effect of young motherhood on children's disruptive behaviour is greatly diminished (see Jaffee et al, 2001; Fergusson & Woodward, 1999). The vast majority of children represented in the analyses of chapter 4 are already at risk of behavioural problems because of their socio-economic position and area of residence (see Fergusson, Swain-Campbell & Horwood, 2004; Keenan & Shaw, 1994), but not all children of young mothers in this more disadvantaged sample developed problems. Thus, sample characteristics may account for the lack of an association between age at first birth and children's disruptive behaviour.

6.4. Antenatal and Postnatal Experiences and Children's Cognitive and Emotional Outcomes: Summary of Key Findings

In terms of explaining the increased risk of cognitive and emotional problems shown by the children of young mothers, key dimensions of the antenatal and postnatal environment were identified. In particular, after exposure to antenatal depression was taken into account, the elevated risk of emotional disorder shown by the children in the early twenties age group was reduced to the level of a non-significant trend. It is notable that the ability antenatal depression had in attenuating the maternal age group difference was found to be somewhat independent of alternate measures of adversity that extended into and beyond the perinatal period. For example, when examined individually, smoking during pregnancy, breastfeeding, and family structure each reduced the extent of the age at first birth effect. However, when the influence of these measures was considered alongside that of antenatal depression, it was the mother's depression during pregnancy that accounted for the greatest proportion of the attenuation effect. Nevertheless, given the degree of association between the antenatal, postnatal and subsequent environment measures highlighted in the current study, it is evident that larger samples are needed to estimate the proportional influence of these different sources of risk.

With regards to children's cognitive functioning, key features of the antenatal and postnatal environment again helped explain the decrement in IQ points shown by the children of young mothers. When examined individually, antenatal depression, smoking, postnatal depression, and breastfeeding each had significant effects upon children's cognition. However, when examined together, it was antenatal smoking, breastfeeding, and postnatal depression that accounted for the greatest proportion of the age at first birth effect. Thus, the deficits in cognitive functioning shown by the

children of young mothers were largely attributable to their increased exposure to cigarette smoke during foetal life, postnatal depression, and the experience of not being breastfed. These findings are consistent with previous studies that have found postnatal depression, breastfeeding, and antenatal smoking to have effects on children's cognitive functioning (Hay & Kumar, 1995; Allen et al, 1998; Kramer et al, 2008; Wakschlag & Hans, 2002), and they are in line with other research that has highlighted the importance of the early caregiving environment for children's cognitive development (Bornstein & Tamis-Lamonda, 1997; O'Connor et al, 2000).

6.5. The Post Infancy Environment and Children's Cognitive and Emotional

Outcomes: Summary of Key Findings

In line with developmental theory (e.g. Elder, 1997; King, 1959; Kessen, 1960) the results reported in chapter 4 also show that in any test of the effect of an earlier experience, attention needs to be given to the importance of the subsequent childrearing environment. For example, while the mother's depression during the early childhood years did not account for the elevated rates of emotional disorder shown by the children in the early twenties age group, exposure to maternal depression during mid to late childhood did appear to have an effect. Once this later risk factor was taken into account, the influence of antenatal depression on children's risk of emotional disorder was considerably reduced. While the design and sample size of chapter 4 limits a true test of these differential effects, it is likely that the children of young mothers who are depressed in pregnancy carry genetic as well as environmental risk for affective disorder. Thus, the elevated rates of emotional disorder shown by the children in the early twenties age group likely reflects the interplay of genetic and environmental processes.

With regards to children's cognitive functioning, key features of the subsequent environment were also seen to exert a significant effect. Initially, the experience of not living with both biological parents at age 11 appeared to promote advances in children's cognitive functioning. However, in line with the findings on emotional disorder, when the simultaneous influence of the alternate antenatal, postnatal and subsequent environment measures were considered, the importance of family structure diminished. It is noteworthy that antenatal depression itself was a predictor of not living with both biological parents at age 11, and when this association was taken into account, the effect of family structure on children's cognitive functioning was removed. This finding draws attention to the fact that the variable 'antenatal depression' is a significant predictor of a number of later measures of environmental adversity. As such, research efforts that seek to test the 'foetal origins hypothesis' need to consider that associations between measures of the antenatal environment and children's development may reflect indirect, as well as direct effects. Thus, while the findings observed in this contemporary dataset lend support to the search for the biological mechanisms that underpin the associations between antenatal insults and child functioning, so too do they pay credence to the teachings of past developmental theorists—who have long pointed out the need to account for the influence of the child's later environment in any test of early experience effects (King, 1959; Kessen, 1960; Solomon and Lessac, 1968).

6.6. *Limitations and Caveats*

Whilst the studies contained in this thesis have many strengths, they are not without their limitations. Even though the samples used in this thesis were of sufficient size to produce statistically meaningful results, they are relatively small when compared to the national cohort studies. The size of the samples meant that a multi-method, multi-informant approach could be adopted, and in-depth psychiatric interviews with mothers and children were possible. Yet, when comparing the differential effects of exposure to maternal depression at different points across the life course, there were an insufficient number of young mothers who were depressed only in the pregnancy. Thus, there was inadequate statistical power in chapter 4 to disentangle antenatal influences from the effects of later exposure to maternal depression. In addition, the sample used in chapters 3 and 4 is limited to a city population with high levels of social and economic adversity. Thus, it is difficult to generalise the findings to other socio-economic groups and geographical locations. Nonetheless, the findings derived from chapters 3 and 4 complement a literature that often excludes, or suffers high attrition rates among young mothers and women living in economically deprived areas (see chapter 2).

The studies contained in Chapters 3 and 4 made use of a prospective longitudinal cohort design. As a result, firstborn and non-first born children were studied from birth, and the antenatal and postnatal environments that they experienced were examined. This mixed parity design and the fact that birth order is not equally distributed across the different age groups adds complexities to the interpretation of the results. Firstly, not all of the women in the young mother age groups were teenagers or in their early twenties at the time of the study child's birth. Thus, data on the women's mental state during their transition to parenthood were not available for

non-first time mothers. As a consequence, it was not possible in Study 1 to decipher whether or not the women's first episode of depression arose during the pregnancy, or the postnatal period of their first live birth. Secondly, whilst the vast majority of women made their transition to parenthood during the early to mid 1980s, a small proportion of women first became mothers in the late 1970s. Thus, the possibility of cohort effects can not be ruled out in the SLCDS data set.

Thirdly, it is possible that firstborn and later born children are differentially affected by their mother's early transition to parenthood. For example, around the time of their first birth, teenage mothers and their children may be in receipt of specialised services that are not available around the time of a subsequent child's birth when the mother is no longer a teenager. On the other hand, analyses did reveal that first-time and non-first time mothers did not differ in their rates of depression, and the patterns of maternal depression for primiparous and multiparous women within the different age groups were markedly similar. Likewise, firstborn and later children of young mothers were found to be at risk of adverse cognitive and emotional outcomes, and age at first birth was a significant predictor of child maladjustment, even after accounting for the mother's age at the study child's birth. Thus, whilst complicating the interpretation of the results, the mixed parity design of Studies 1 and 2 did highlight the fact that women who become mothers in the teenage or early twenties years are at risk of depression in first and subsequent pregnancies, and that their first and non-first born children are at risk of adverse outcomes. Nevertheless, the complexities of a mixed parity design necessitated a third study of contemporary first time mothers (Chapter 5).

A limitation central to chapter 5 is the cross-sectional nature of the analyses. Thus, the bi-directional nature of the relationship between antenatal depression and its

predictors, e.g. housing dissatisfaction and serious relationship difficulties, cannot be unravelled (see chapter 5 for a further discussion of this point). It would, however, prove quite difficult to conduct a prospective longitudinal design of pregnancy in order to identify the predictors of antenatal depression. One option would be to conduct a three generational study of mothers and their children. Such a design would require the second generation to alert the interview team when they are pregnant. Thus, the antenatal environment experienced by the third generation could then be studied. The South London Child Development Study could meet these requirements. Alternatively, a sample of adolescent girls at high risk of an early pregnancy could be studied. Again however, actually identifying and interviewing these young women when they are pregnant could prove problematic given the often chaotic nature of their lives.

A further limitation of the sample studied in chapter 5 is the recruitment strategy. Unlike the sampling frame used in chapters 3 and 4, permission was not granted for the acquisition of the names and contact details of all first-time parents in the geographical locations from which the sample was drawn. Thus, it is difficult to know how well the sample represents the population. Nevertheless, the sample used in chapter 5 did compare quite favourably with national statistics on a number of key indices (e.g. ethnicity and marital status), and most importantly, the mean age at first birth for the women studied in chapter 5 was almost identical to the UK average.

6.7. Implications of the Findings for Theory and Future Research

As discussed in chapter 1, the literature on the correlates and consequences of early parenthood has largely borne out sociological, economic, epidemiological and demographic traditions, and this literature has been dominated by a focus on teenage

motherhood. In response, the studies contained in this thesis applied a developmental perspective to the study of young motherhood at a time when the demographic characteristics of first time parents are undergoing significant changes. Over the last 4 decades, the industrialised nations have witnessed a dramatic upward shift in the average age at entry into parenthood, with most contemporary young women deferring childbearing until their late 20s and early 30s. In light of these demographic changes, it was hypothesised that the risks formerly associated with teenage motherhood would now be observed among contemporary cohorts of women who made the transition to parenthood in their early twenties. Indeed, the findings contained within the 3 empirical chapters of this thesis upheld that claim. Thus, future studies into the correlates and consequences of an early transition to parenthood need to consider the fact that women who become mothers in their early twenties, and their children, are at risk.

This thesis has demonstrated that the risks formerly associated with teenage motherhood are now seen among early twenties mothers and their children. These findings are consistent with contemporary theories of development in young adulthood, most notably, Jeffrey Arnett's theory of '*emerging adulthood*' (Arnett, 2000). For most young people living in industrialised countries, the late teens through the early twenties are a time of profound change and personal growth; career options are explored, different romantic relationships are tested, and many young people leave the parental home and place of origin to further their experiences (Arnett, 2006). Entry into parenthood during the early twenties may inhibit life opportunities and personal growth. Career development and educational advancement would be limited by childbearing in the early twenties, and this may have negative implications for parents and children. Parents in their early twenties may make comparisons with their

peers, whose opportunities to participate in education and to explore different relationships are not restricted by parental responsibilities. These comparisons may lead to negative evaluations of the parental role, or indeed attempts by early twenties parents to engage in the risky, experimental activities of their cohort members. Thus, the theory of 'emerging adulthood' contributes to the understanding of the findings in this thesis that relate to early twenties mothers and their children.

Additionally, an added explanation could be that unlike teenage mothers, women who enter parenthood in their early twenties are not seen by the state or the family to be in need of additional support. Intervention and policy efforts are not targeted at early twenties mothers and their children, and many of the services available for teenage mothers are not accessible to mothers in their early twenties. What is more, the heavy involvement of the parents of teenage mothers in their grandchildren's upbringing may not occur for early twenties mothers and their children. For the grandparent generation, early twenties parenthood was more normative. As such, the parents of early twenties mothers may not understand the complexities of contemporary parenthood in young adulthood. As a consequence, family support for early twenties mothers may not be as widely available as it is for teenage mothers. This hypothesised lack of parental support may then have consequences for early twenties mothers and their children.

In applying developmental theory to the study of the psychological correlates and consequences of young motherhood, this thesis took the viewpoint that 'age is not a causal variable' (Wohlwill, 1970). Instead, the point of view adopted in this thesis was that a mother's chronological age at first birth is a marker for a number of associated individual and environmental characteristics that could impact negatively upon the developmental outcomes of young mothers and their children. To help

elucidate the underlying mechanisms that give rise to the associations between young age at first birth and adverse maternal and child outcomes, core principles of life course and early experience theory were drawn upon.

Life course theory predicts that because young mothers are ‘off-time’ in their transition to parenthood, they suffer adverse economic, educational and social experiences that affect their own and their child’s development (Elder, Caspi, & Burton, 1988). The findings in this thesis suggest that while this hypothesis is in part supported, it also requires expansion. An early transition to parenthood is a non-random event, and many of the factors found to account for the adverse outcomes experienced by the children of young mothers were present before the women made their transition to parenthood. For example, IQ is a relatively stable characteristic that would likely be unaffected by an early transition to parenthood, and for children’s cognitive outcomes, maternal IQ was found to account for a significant proportion of the age at first birth effect. Similarly, while exposure to maternal depression was found to partly account for the adverse cognitive and emotional outcomes experienced by the children of young mothers, many of the young women who were depressed during their child’s lifetime showed evidence of a vulnerability to mental illness prior to their transition to parenthood. While the mixed parity design of chapter 3 meant that this finding was less observable, a prior history of mental illness was a clear and robust predictor of antenatal depression in chapter 5. Therefore, these findings are consistent with the ‘selection effects’ principle which is also a central tenet of life course theory (Elder, 1997), and they are in line with the findings derived from the Dunedin and Christchurch longitudinal studies (see Fergusson & Woodward, 1999; Jaffee et al, 2001). Nevertheless, future studies into the effects of an early transition to parenthood on outcomes for mothers and children would benefit from obtaining

detailed information on the individual and environmental characteristics that epitomise the women's lives prior to their entry to parenthood.

As mentioned previously, the findings reported in this thesis are consistent with those of Jaffee and colleagues (2001), who found evidence in support of the both the 'off-time transitions' and 'selection effects' principles of life course theory. However, the results of this thesis attest to the fact that when examining the effects of exposure to adverse experiences on children's development, attention needs to be given to the time point in the child's life course when this exposure took place. Early experience effects were not considered by Jaffee and colleagues, largely because their longitudinal study began some time after the children were born. As young mothers navigate their transition to parenthood, and when they repeat the childbearing process with subsequent children, they often engage in activities (e.g. antenatal substance use) and suffer mental health problems that negatively affect their own, and their child's later functioning. Only rarely do they engage in activities that promote optimal developmental outcomes in their offspring (e.g. breastfeeding). Thus, future studies into the effects of an early transition to parenthood on outcomes for mothers and children need to pay attention to the antenatal and postnatal environment.

6.8. Implications of the Findings for Policy and Intervention

The findings of this thesis have significant implications for policy and intervention initiatives. Currently, in the UK, health visitors and other members of the primary care team routinely screen for depression during the postnatal months, and intervention initiatives such as the Flying Start programme have policies that address the mother's emotional well being after childbirth (Flying Start, 2007). The results of this thesis urge for a change in focus; the need for policy and intervention

programmes to screen for, and to treat, depression during pregnancy is evident. The analyses contained in chapter 3 revealed that almost three quarters of the young mothers with postnatal depression were depressed in pregnancy. The detection and treatment of depression in pregnancy will not only accelerate treatment for mothers, it could also improve the developmental outcomes of children. During the antenatal period, health care professionals are in a unique position to screen for depression as it is a time when women are in frequent contact with the health service. Thus, the four core predictors of antenatal depression identified in chapter 5 (a personal history of affect disorder, housing dissatisfaction, serious relationship difficulties, and a parental history of psychiatric illness) could be used by midwives and other health care professionals to help detect the young women most vulnerable to depression during pregnancy.

Chapters 3 and 5 showed quite clearly that antenatal depression is rarely detected. What is more, the majority of women who consulted a member of the primary care team about their illness were seldom offered treatment (see chapters 3 and 5). At present, psychotropic medication is the most common form of therapy for depressive illness. Yet during pregnancy, health care professionals are reluctant to prescribe medication because of the unknown effects such medicines have on the developing child (O'Keane, 2006). Thus, there is a great need for more funding to be made available so that primary care trusts can increase access to psychotherapy for pregnant women. However, if such services were to be made more widely available, the time spent on waiting lists will need to be kept to a minimum due to the time-limited nature of pregnancy.

During the antenatal period, the young mothers were more likely to smoke, and during the postnatal period, they were less likely to breastfeed. The adverse

outcomes shown by the children of young mothers were in part accounted for by their increased exposure to antenatal smoking and their decreased likelihood of being breastfed. Thus, these findings suggest that policy and intervention initiatives that focus on the promotion of breastfeeding and the cessation of smoking among young mothers would improve the long term outcomes of their children. As well as the cessation of cigarette smoking, the results of chapter 5 also highlight the need for intervention services to reduce the antenatal use of cannabis among young mothers. Of course, encouraging young mothers to quit smoking and to give up cannabis would also improve their own long-term health outcomes.

One of the most striking findings in this thesis was the high prevalence of adverse outcomes among early twenties mothers and their children. At present, the literature on maternal age and offspring risk, and the resulting intervention strategies are predominantly concerned with teenage mothers and their children. Thus, the policy and intervention initiatives advocated in this thesis need to be directed toward mothers in their early twenties and their children, as well as toward adolescent mothers and their offspring. What is more, the numerous analyses contained in this thesis attest to the fact that it is the mother's age at first birth that is the risk marker. Thus, women who begin childbearing early, but who are not necessarily young at the time of a subsequent child's birth are likely to bestow risks to themselves, and to their children. Later born as well first born children of young mothers are at risk of adverse outcomes. Therefore, policy and intervention programmes need to be directed toward older women who began childbearing early, as well as toward women who are currently young when they present for antenatal care. These implications are not recognised in the UK government's policies into young motherhood, which are dominated by a focus on teenage parenthood.

In 1999, the UK government set up the Teenage Pregnancy Unit, which has the remit of implementing the national teenage pregnancy strategy. This ten year strategy has 2 core aims: firstly, to halve the rate of conceptions among under-18s, and secondly, to reduce the risk of long term social exclusion for teenage mothers and their children by encouraging young mothers back into education, employment and training (Teenage Pregnancy Independent Advisory Group, 2008). As part of the strategy, the Sure Start Plus initiative was piloted in 35 Local Authorities with high rates of teenage pregnancy. These pilot projects sought to provide a co-ordinated package of support to help with issues such as housing, health care, parenting skills, re-engagement in education, and childcare. The recent report by the Department of Health concluded that while the national teenage pregnancy strategy has been successful in reducing the number of births to teenage mothers, there is less evidence that similar progress has been made on improving outcomes for teenage mothers and their children (Department of Health, 2007).

While the government is to be commended in its efforts to improve the outcomes of young mothers and their children, insufficient funding has limited the effectiveness of the Sure Start Plus Initiative (Wiggins et al, 2005). What is more, the Sure Start Plus programmes were found to have the least impact on objectives related to smoking cessation, support for breastfeeding, and reducing the rates of postnatal depression (Wiggins et al, 2005). The results of this thesis underscore the importance of rectifying these shortcomings, and they argue for the need to focus on antenatal as well as postnatal depression. Furthermore, the current findings highlight the need for support for early twenties mothers and for mothers who began childbearing early but who are not necessarily young at the time of a subsequent child's birth.

6.9. Future Directions

The corpus of research contained in this thesis has highlighted the need for increased attention to be given to the antenatal period in the context of young motherhood. However, evidence of effects of smoking and depression during pregnancy on the cognitive and emotional functioning of children born to young mothers does not specify the causal mechanisms that underpin these associations. In light of the recent research into the ‘foetal origins hypothesis’ (see chapter 2), future studies should seek to obtain measures of the mothers and the child’s neuroendocrine functioning. Considering the high prevalence of antenatal depression among the women who entered parenthood in their teenage and early twenties years, studies of young mothers could prove the ideal context in which to test a number of different biological hypotheses about the effects of antenatal influences. However, on a cautionary note, the studies contained in this thesis underscore the importance of taking into account antenatal substance use, as well as measures of later adversity.

In light of the intergenerational transmission of psychopathology and cognitive deficits among young mothers and their offspring, there is a need for future studies to be conducted within the context of genetically informative designs. The fact that 74% of the young women with a parental history of mental illness became depressed in pregnancy raises the suspicion that genetic and/or environmentally mediated physiological processes could underpin these associations. Genetically informative designs are needed, as behavioural geneticists have repeatedly highlighted the fact that the experience of exposure to an adverse psychosocial environment provided by a depressed parent is typically confounded with exposure to genetic risk (Plomin, 1995). Thus, gene-environment correlation is likely to potentiate a child’s risk of adverse cognitive, behavioural and emotional outcomes.

In relation, it is also possible, and even likely, that the young women who became depressed in pregnancy were themselves exposed to antenatal depression during foetal life. The HPA axis of pregnant women is subject to significant changes during the gestational period (O'Keane, 2006). Women who incurred insults to the development of their own HPA axis during foetal life may be more likely to suffer the consequences of this early damage during a time of great biological change. The manifestation of such damage (i.e. antenatal depression and its physiological correlates) may thereby affect the development of their offspring's neuroendocrine system. Thus, physiological processes that are environmentally as well as genetically mediated may account for the intergenerational transmission of disorder in the context of young motherhood. Future studies would ideally be physiologically, as well as genetically informative. Again, three generational prospective longitudinal designs would prove the ideal context in which to test these hypotheses.

Previous research conducted within the context of a genetically informative design has shown that environmental, as well as genetic, mechanisms are important in understanding the intergenerational transmission of psychopathology (Kim-Cohen et al., 2005). Thus, indices of the care-giving environment not measured in the current thesis should be obtained in future research. In particular, the studies contained in this thesis did not account for the potential impact of the quality of early childrearing experiences and current attachment representations on the mother's and the child's risk of psychopathology. For example, women with an insecure attachment style in their current adult relationships have been shown to be at heightened risk of postnatal depression (Bifulco et al, 2004), and a mother's own state of mind regarding attachment has been found to moderate the association between postpartum depression and insecure mother-child attachment (McMahon, Barnett, Kowalenko &

Tennant, 2006). Furthermore, physical, sexual and emotional abuse in childhood, and low parental care and overprotection have been found to be significant risk factors for antenatal depression (Kitamura, Sugawara, Shima, & Toda, 1999; Leigh & Milgrom, 2008; Rogers et al, 2003). Thus, future studies in the context of young motherhood would benefit from obtaining detailed measures of the mother's and the child's early childrearing experiences and their attachment representations.

In addition, past research has found that paternal as well as maternal mental health negatively affects children's development (Ramchandani et al, 2005). In particular, depression in fathers in the postnatal period is associated with increased rates of subsequent behavioural problems in children (Carro, Grant, Gotlib, & Compas, 1993; Ramachandani, O'Connor, Evans, Heron, Murray, & Stein, 2008). The findings in this thesis do indicate an association between measures of the couple relationship, antenatal depression, and children's outcomes. Thus, future research should seek to obtain information on fathers as well as mothers. The sample studied in chapter 5 is part of an ongoing prospective longitudinal study of children's development, and when possible, fathers as well as mothers were interviewed. Therefore in future analyses of the Cardiff Child Development Study data set, it will be possible to study the effects of paternal as well as maternal mental health on the outcomes of children born to young mothers.

Furthermore, future research in the context of young motherhood would benefit from examining the effects of grandparents on the lives of children. Information on the wider social and family network of young mothers will enable a test of the hypothesis outlined previously which suggested that the adverse outcomes of early twenties mothers and their children could in part reflect decreased levels of grandparent support. Additionally, future studies on young mothers and their children

should seek to examine the factors that act as protective mechanisms. The literature on young motherhood is heavily dominated by the prediction of risk. The results of this thesis have shown that not all young mothers and their children experience adverse outcomes. Thus, the search for protective factors seems to be the next logical step.

6.10. *Conclusions*

Across three studies and two different samples, the findings contained in this thesis have shown that the risks formerly associated with teenage motherhood are now seen to pan out among early twenties mothers and their offspring. Study 1 found that women who entered parenthood in their teenage and early twenties years are at an increased risk of experiencing a depressive episode during pregnancy. The longitudinal assessment of the women's mental state over the 11 year period that followed their child's birth revealed that the majority of young mothers with antenatal depression went on to experience subsequent episodes, both in the postpartum, and during their children's early childhood and middle childhood years. In study 2, the increased prevalence of antenatal depression among the women who became mothers at young ages, along with the sub-optimal antenatal and postnatal environments that they provided, were then seen to partly account for the elevated rates of emotional disorder and cognitive deficits shown by their offspring. Study 3 replicated the finding of high rates of antenatal depression among both groups of young mothers. In addition, this study identified four core predictors of antenatal depression among the women who became mothers at young ages: housing dissatisfaction, serious relationship difficulties, a personal history of affective disorder, and a family history

of psychiatric illness. Furthermore, across both samples, high rates of antenatal substance use were also observed.

The corpus of research contained in this thesis illustrates the need for policy and intervention programmes to take a wider stance on young motherhood, as it is clear that the needs of early twenties mothers and their offspring should be addressed. Thus, intervention programmes for adolescent mothers should be broadened to allow participation among early twenties mothers and their offspring. It is clear from the findings presented in this thesis that the mother's mental health should prove a focal point for intervention work, and such initiatives need to focus on the mothers functioning during the antenatal as well the postnatal months. The four core predictors of antenatal depression identified in chapter 5 could be used by midwives and other health care professionals to help identify the young mothers most at risk of current and subsequent mental health problems. Due to the unknown effects that psychotropic medication has on foetal development, it is clear that increased access to psychological therapy is needed. Furthermore, the findings of this thesis suggest that initiatives that focus on the cessation of antenatal substance use and breastfeeding promotion will improve the long terms outcomes of young mothers and their children.

References

- Ainsworth, M.D.S. (1969). Object relations, dependency, and attachment: Theoretical review of the infant-mother relationship. *Child Development*, 40, 969-1025.
- Affonso, D.D., Lovett, S., Paul, S.M., Sheptak, S. (1990). A standardised interview that differentiates pregnancy and postpartum symptoms from perinatal clinical depression. *Birth*, 1990, 17, 121-30.
- Allen, N.B., Lewinsohn, P.M., & Seeley, J.R. (1998). Prenatal and perinatal influences on risk for psychopathology in childhood and adolescence. *Development and Psychopathology*, 10, 513-529.
- American Psychiatric Association (2000). Diagnostic and Statistical Manual of Mental Disorders. 4th Ed, Text revised. Washington, DC.
- Anderson, J.W., Johnstone, B.M. & Remley, D.T. (1999). Breast-feeding and cognitive development: A meta-analysis *American Journal of Clinical Nutrition*. 70 (4), 525-535.
- Andreozzi, L., Falanigan, P., Seifer, R., Brunner, S., & Lester, B. (2002). Attachment classifications among 18-month-old children of adolescent mothers. *Archives of Paediatrics & Adolescent Medicine*, 156 (1), 20-26.
- Angold, A., Costello, E.J. (1995). The Child and Adolescent Psychiatric Assessment (CAPA). *Journal of the American Academy of Child Adolescent Psychiatry*, 39, 39-48.
- Angold, A., Prendergast, M., Cox, A. Harrington, R., Simonoff, E. & Rutter, M. (1995). The Child and Adolescent Psychiatric Assessment (CAPA). *Psychological Medicine*, 25, 739-753.

- Angold, A., Erkanli, A., Costello, E.J., Rutter, M. (1996). Precision, reliability and accuracy in the dating of symptom onsets in child and adolescent psychopathology. *Journal of Child Psychology and Psychiatry* 37, 657-664.
- Areias, M.E., Kumar, R, Barros, H., Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth: validation of the Edinburgh Postnatal Depression Scale in Portuguese mothers. *British Journal of Psychiatry*, 169, 30-35.
- Arnett, J.J. (1992). Reckless behaviour in adolescence: A developmental perspective. *Developmental Review*, 12, 339-373.
- Arnett, J.J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55 (5), 469-480.
- Arnett, J.J. (2006). *Emerging adulthood: The winding road from the late teens through the twenties*. Oxford University Press, Inc: Oxford.
- Austin, M-P., Tully, L., & Parker, G. (2007). Examining the relationship between antenatal anxiety and postnatal depression. *Journal of Affective Disorders*, 101, 169-174.
- Avon Longitudinal Study of parents and Children (ALSPAC). <http://www.bristol.ac.uk/alspac>.
- Bachman, J.G., Johnston, L.D., O'Malley, P., & Schulenberg, J. (1996). Transitions in drug use during late adolescence and young adulthood. In J.A., Graber, J. Brooks-Gunn, & A.C. Peterson, (Eds.). *Transitions through adolescence: Interpersonal domains and contexts (pp. 111-140)*. Mahwah, NJ : Erlbaum.
- Barber, J.S. (2001). Ideational influences on the transition to parenthood: Attitudes toward childbearing and competing alternatives. *Social Psychology Quarterly*, 64, 101-127.

- Bardone, A.M., Moffitt, T.E., Caspi, A., Dickson, N., & Silva, P.A. (1996). Adult mental health and social outcomes of adolescent girls with depression and conduct disorder. *Development and Psychopathology*, 8, 811-829.
- Bardone, A.M., Moffitt, T.E., Caspi, A., Dickson, N., Stanton, W.R., & Silva, P.A. (1998). Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37 (6), 594-601.
- Barker, D.J.P. (1998). In utero programming of chronic disease. *Clinical Science*, 95, 115-128.
- Barnes, A. (2003). Australia's fertility rate: Trends and issues. *Department of Family and Community Services Research Fact Sheet*, No. 9.
- Barnett, B.E.W., Hanna, B., Parker, G. (1983). Life event scales for obstetric groups. *Journal of Psychosomatic Research*, 27, 4, 313-320.
- Barnet, B., Joffe, A., Duggan, A.K., Wilson, M., Repke, J. (1996). Depressive symptoms, stress, and social support in pregnant and post partum adolescents. *Achieves of Paediatric and Adolescent Medicine*, 150, 64-69.
- Barrera, M. (1983). A method for the assessment of social support networks in community survey research. *Connections*, 3, 8-13.
- Barros, M. C. De M., Guinsburg, R., Peres. C. De A, Miysuhiro, S., Chalem, E., & Laranjeira, R.R. (2006). Exposure to marijuana during pregnancy alters neurobehavior in the early neonatal period. *The Journal of Pediatrics*, December, 781-787.
- Barth, R.P., Schinke, S.P., & Maxwell, J.C. (1983). Psychological Correlates of teenage motherhood. *Journal of Youth and Adolescence*, 12, 471-487.
- Beach, F.A. & Jaynes, J.J. (1954). Effects of early experience upon the behaviour of animals. *Psychological Bulletin*, 51, 239-263.

- Beardslee, W. R., Zuckerman, B. S., Amaro, H., & McAllister. (1988). Depression among adolescent mothers: A pilot study. *Developmental and Behavioural Pediatrics, 9*, 62-65.
- Beck, A.T., Steer, R.A., & Garbin, M.G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty five years of evaluation. *Clinical Psychology Review, 8*, 77-100.
- Bennett, H.A., Einarson, A., Taddio, A., Koren, G., & Einarson, T. (2004). Prevalence of depression during pregnancy: systematic review. *American College of Obstetrics and Gynaecologists, 103*, 4, 698-709.
- Bergman, K.M., Sarkar, P., O'Connor, T.G., Modi, N., Glover, V. (2007). Prenatal Stressful life events predict child cognitive outcomes. *Early Human Development, 83*, (2), 136-138.
- Berrington, A., Diamond, I., Ingham, R., & Stevenson, J. with Borgoni, R., Hernandez, I., Smith, P.W.F. (2005). Consequences of teenage parenthood: Pathways which minimise the long term negative impacts of teenage childbearing. *Department of Health. Final report—November 2005*.
- Bewley, S., Davies, M., & Braude, P. (2005). Which career first? *British Medical Journal, 331*, 588-589.
- Bifulco, A., Figueiredo, B., Guedeney, N., Gorman, L.L., Hayes, S., Muzik, M., Glatigny-Dallay, E., Valoriani, V., Kammerer, M.H., Henshaw, C.A., and the TCS-PND Group. Maternal attachment style and depression associated with childbirth: preliminary results from a European and US cross-cultural study. *British Journal of Psychiatry, 184*, (46), 31-37.

- Birkeland, R., Thompson, K., Phares, V. (2005). Adolescent mothers and postpartum depression. *Journal of Clinical Child and Adolescent Psychology*, 34, (2), 292-300.
- Black, M.M., Papas, M.A., Hussey, J.M., Hunter, W., Dobowitz, H., Kotch, J.B., English, D., & Schneider, M. (2002). Behaviour and development of preschool children born to adolescent mothers: Risk and 3-generation households. *Journal of Pediatrics*, 109 (4).
- Black, M.M., Papas, M.A., Hussey, J.M., Dobowitz, H., Kotch, J.B., Starr, R.H. (2002b). Behaviour problems among preschool children born to adolescent mothers: Effects of maternal depression and perceptions of partner relationships. *Journal of Clinical Child and Adolescent Psychology*, 31(1), 16-26.
- Boden, J.M., Fergusson, D.M., & Horwood, L.J. (2008). Early motherhood and subsequent life outcomes. *Journal of Child Psychology and Psychiatry*, 49, (2), 151-160.
- Bonari, L., Pinto, N., Ahn, E., Einarson, A., Steiner, M., & koren, G. (2004). Perinatal risks of untreated depression during pregnancy. *Canadian Journal of Psychiatry*, 49, 726-35.
- Bonell, C. (2004). Why is teenage pregnancy conceptualised as a social problem? A review of quantitative research from the USA and UK. *Culture, Health & Sexuality*, 6 (3), 255-272.
- Bornstein, M.H., & Tamis-Lamonda, C.S. (1997). Maternal responsiveness and infant mental abilities. *Infant Behavior and Development*, 20, 283-296.

- Boroni, A., Bonu, M.A., Coticchio, G., Bianchi, V., Cattoli, M., & Flamigni, C. (2004). Pregnancies and births after oocyte cryopreservation. *Fertility and Sterility*, 82, 601-605.
- Bosch, X. (1998). Investigating reasons for Spain's falling birth rate. *Lancet*, 352, 887.
- Bowen, A. & Muhajarine, N. (2006). Prevalence of antenatal depression in women enrolled in an outreach program in Canada. *JOGNN*, 35 (4), 491-498.
- Bowlby, J. (1958). The nature of the child's tie to his mother. *International Journal of Psycho-Analysis*, 39, 350-373.
- Broman, S. (1981). Seven-year outcome of 4,000 children born to teenagers in the United States. In K. Scott, T. Field, & E. Robertson (Eds.), *Teenage parents and their offspring* (pp. 195-226). New York: Grune & Stratton.
- Brook, J., Brook, D., & Whiteman, M., (2000). The influence of maternal smoking during pregnancy on the toddler's negativity. *Archives of Pediatric and Adolescent Medicine*, 154, 381-385.
- Brooker, B.H., & Cyr, J.T. (1986). Tables for clinicians to use to convert WAIS-R short forms. *Journal of Clinical Psychology*, 42, 982-986.
- Brooks-Gunn, J. & Chase-Lansdale, P.L. (1995). Adolescent parenthood. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 3. Status and social conditions of parenting* (pp. 113-149). Mahwah, NJ: Erlbaum.
- Brooks-Gunn, J. & Furstenberg, F.F. (1986). The children of adolescent mothers: Physical, academic, and psychological outcomes. *Developmental Review*, 6, 224-251.
- Brown, G.W. & Harris, T. (1978). *Social Origins of Depression*. New York. The Free Press.

- Brugha, T.S., Bebbington, P., Tennant, C., Hurry, J. (1985). The list of life threatening experiences: a subset of 12 life event categories with considerable contextual threat, *Psychological Medicine*, 15, 194-198.
- Buist, A. (2000). Managing depression in pregnancy. *Australian Family Physician*, 29, (7); 663-667.
- Caldwell, C.H., Antonucci, T.C., Jackson, J.S. (1998). Supportive/conflictual family relations and depressive symptomatology: Teenage Mothers and Grandmother perspectives. *Family Relations*, 47, 395 – 402.
- Caldwell, C, H., Antonucci, T, C., Jackson, J,S., Wolford, M., & Osofsky, J,O. (1997). Perceptions of parental support and depressive symptomatology among African American and White adolescent mothers. *Journal of Emotional and Behavioural Disorders*, 5, 173 – 183.
- Campbell, S.B., Cohn, J.F., Flanagan, C., Popper, S., & Meyers, T. (1992). Course and correlates of postpartum depression during the transition to parenthood. *Development and Psychopathology*, 4, 29-47.
- Campbell, S.B., & Cohn, J.F. (1997). The timing and chronicity of postpartum depression: Implications for infant development. In Murray & Cooper (Eds), *Postpartum depression and child development (pp. 165-197)*. New York: Guilford Press.
- Caputo, V.G., & Bordin, I.A., (2007). Mental health problems among pregnant and non-pregnant youth. *Rev Saude Publica*, 41 (4), 1-8.
- Carro, M., Grant, K., Gotlib, I., & Compas, B. (1993). Postpartum depression and child development: An investigation of mothers and fathers as sources of risk and resilience. *Development and Psychopathology*, 5, 567-579.

- Cassidy, B., Zoccolillo, M., & Hughes, S. (1996). Psychopathology in adolescent mothers and its effect on mother-infant interactions: A plot study. *Canadian Journal of Psychiatry*, 41, 379-384.
- Chou, F-H., Lin, L-L., Cooney, A.T., Walker, L.O., & Riggs, M.W. (2003). Psychosocial factors related to nausea, vomiting, and fatigue in early pregnancy. *Journal of Nursing Scholarship*, 35 (2), 119-125.
- Cohn, J.F., Matias, R., Tronick, E.Z., Lyons-Ruth., Connell, D. (1986). Face-to-face interactions, spontaneous and structured, of mothers with depressive symptoms. In Field, T. & Tronick, E.Z. (Eds), *Maternal depression and child development. New directions for child development*, No. 34, (pp 31-46), San Francisco: Josey-Bass.
- Cohn, J.F. & Tronick, E.Z. (1989). Specificity of infant's response to mother's affective behaviour. *Journal of the American Academy of Child and Adolescent Psychiatry*, 28, 242-248.
- Cohen, L.S., Altshuler, L.L., Harlow, B.L., Nonacs, R., Newport, D.J., Viguera, A.C., Suri, R., Burt, V.K., Hendrick, V., Reminick, A.M., Loughhead, A., Vitonis, A.F., & Stowe, Z.N. (2006). Relapse of major depression during pregnancy in women who maintain or discontinue antidepressant treatment. *JAMMA*, 295 (5), 499-507.
- Coleman, E.Z., Ghodsian, M., & Wolkind, S.N. (1986). Depression in mothers 6 years after the birth of a first child. *Social Psychiatry*, 21, 27-82.
- Coley, R.L., & Chase-Lansdale, P.L. (1998). Adolescent pregnancy and parenthood: Recent evidence and future directions. *American Psychologist*, 53, 152-166.
- Colletta, N. D. (1983). At risk for depression: A study of young mothers. *The Journal of Genetic Psychology*, 142, 301-310.

- Condon, J.T., & Corkindale, C. (1997). The correlates of antenatal attachment in pregnant women. *British Journal of Medical Psychology*, 70 (4), 359-372.
- Cooper, L.G., Leland, N.L., & Alexander, G. (1995). Effect of maternal age on birth outcomes among young adolescents. *Social Biology*, 42 (1-2), 22-35.
- Cooper, C., Jones, L., Dunn, E., Forty, E., Haque, S., Oyebode, F., Craddock, N., Jones, I. (1997). Clinical presentation of postnatal and non-postnatal depressive episodes. *Psychological Medicine*, 37, (9), 1273-1280.
- Cornelius, M.D., Goldschmidt, L., DeGenna, N., & Day, N.L. (2007). Smoking during teenage pregnancies: effects on behavioural problems in offspring. *Nicotine & Tobacco Research*, 9 (7), 739-750.
- Costello, E.J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Achieves General Psychiatry*, 60, 837-844.
- Cox, J., Holden, J., Sagovsky, R. (1987). Detection of postnatal depression: development of a 10-item postnatal depression scale. *British Journal of Psychiatry*, 150, 782-786.
- Cummings M.E., Davies, P, T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry*, 35, (1), 73-112.
- Davidson, J., & Robertson, E. (1985). A follow-up study of post partum illness, 1946-1978. *Acta Psychiatrica Scandinavica*, 71, 5, 451-457.
- Davis, E, P., Snidman, N., Wadhwa, P, D., Gynn, L, M., Schetter, C, D., Sandman, C. (2004). Prenatal maternal anxiety and depression predict negative behavioural reactivity in infancy. *Infancy*, 6 (3) 319-331.

- Davis, E.P, Glynn, L.M., Dunkel-Schetter, C., Hobel, C., Chicz-Demet, A., Sandma, C.A. (2005). Corticotropin-releasing hormone during pregnancy is associated with infant temperament. *Developmental Neuroscience*, 27: 299–305.
- Da Costa, D., Larouche, J., Dritsa, M., & Brender, W. (2000). Psychosocial correlates of prepartum and postpartum depressed mood. *Journal of Affective Disorders*, 59, 31-40.
- Deal, L. W., & Holt, V. L. (1998). Young maternal age and depressive symptoms: Results from the 1988 National Maternal and Infant health Survey. *American Journal of Public Health*, 88, 266-270
- Dearden, K., Hale, C., & Blankson, M. (1994). Family structure, function and the early transition to fatherhood in Great Britain: Identifying antecedents using longitudinal data. *Journal of Marriage and the Family*, 56, 844-852.
- Department of Health. (2007). Teenage parents next steps: guidance for local authorities and primary care trusts. www.everychildmatters.gov.uk.
- Dunnell, K. (1979). *Family Formation 1976*. HM Stationary Office. London.
- East, P.L., Reye, B.T., & Horn, E.J. (2007). Association between adolescent pregnancy and a family history of teenage births. *Perspectives on Sexual Reproductive Health*, 39 (2), 108-115.
- Elder, G.H., Jr. (1975). Age differentiation and the life course. *Annual Review of Sociology*, 1, 165-190.
- Elder, G.H., Jr. (1997). The life course and human development. In W. Damon., & Lerner, R.M., (Eds.). *Handbook of child psychology. Vol. 1: Theoretical models of human development* (5th ed., pp. 939-991). New York: Cambridge University Press.

- Elder, G.H., Jr. (1998). The life course as developmental theory. *Child Development*, 69 (1), 1-12.
- Elder, G.H., Jr., Caspi, A., & Burton, L.M. (1988). Adolescent transition in developmental perspective: Sociological and historical insights. In M.R. Gunnar & W.A. Collins (Eds.), *The Minnesota Symposia on Child Psychology: Vol. 21. Development during the transition to adolescence* (pp. 151-179. Hillsdale, NJ: Erlbaum.
- Elder, G.H., Jr., & O'Rand, A.M. (1995). Adult lives in a changing society. In K.S. Cook., G.A. Fine., J.S. House, (Eds.). *Sociological perspectives on social psychology*. Allyn & Bacon: Boston.
- Elfenbein, D.S., & Felice, M.E. (2003). Adolescent pregnancy. *Pediatric Clinical Journal of North America*, 50, 781-800.
- Elias, P., McKnight, A., & Kinshott, G. (1999). SOC 2000: Redefining skill revision of the standard occupational classification. *Skill Task Force Research Paper 19*.
- Essex, M.J., Klein, M.H., Miech, R., & Smider, N.A. (2001). Timing of initial exposure to maternal major depression and children's mental health symptoms in kindergarten. *British Journal of Psychiatry*, 179, 151-156.
- Endicott, J., & Spitzer, R.L. (1978). A diagnostic Interview: the schedule for affective disorders and schizophrenia. *Achieves of General Psychiatry*, 35: 837-44.
- Evans, J., Heron, J., Francomb, H., Oke, S., Golding, J. (2001). Cohort study of depressed mood during pregnancy and childbirth. *British Medical Journal*, 323, 257-260.
- Fameli, M., Kitraki, E., & Sylianopolou, F. (1994). Effects of the hyperactivity of the maternal hypothalamic-pituitary-adrenal axis during pregnancy on the

development of the HPA axis and brain monoamines of the offspring.

International Journal of Developmental Neuroscience, 12, 651-659.

Fagot, B.I., Pears, K.C., Capaldi, D.M., Crosby, L., & Leve, C.S. (1998). Becoming an adolescent father: Precursors and parenting. *Developmental Psychology*, 34, 1209-1219.

Felice, E., Saliba, J., Grech, V., & Cox, J. (2004). Prevalence rates and psychosocial characteristics associated with depression in pregnancy and postpartum in Maltese women. *Journal of Affective Disorders*, 82, 297-301.

Feng, X., Shaw, D.S., & Silk, J.S. (2008). Development trajectories of anxiety symptoms among boys across early and middle childhood. *Journal of Abnormal Psychology*, 117 (1), 32-47.

Fergusson, D.M., & Lynskey, M.T. (1993). Maternal age and cognitive and behavioural outcomes in middle childhood. *Paediatric and Perinatal Epidemiology*, 7, 77-91.

Fergusson, D.M., & Woodward, L.J. (1999). Maternal age and educational and psychosocial outcomes in early adulthood. *Journal of Child Psychology and Psychiatry*, 43, 479-489.

Fergusson, D.M., & Woodward, L.J. (2000). Teenage pregnancy and female educational under-achievement. *Journal of Marriage and the Family*, 62, 147-161.

Fergusson, D.M., Horwood, J., & Ridder, E. (2005). Show me the child at seven: The consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry*, 46 (8), 837-849.

Field, T., Fox, N. A., Pickens, J., & Nawrocki, T. (1995). Right frontal EEG activation in 3- to 6-month-old infants of depressed mothers. *Developmental*

Psychology, 31,358-363.

- Field, T., Diego, M., Dieter, J., Hernandez-Reif, M., Schanberg, S., Kuhn, C., Yando, R., Bendell, D. (2004) Prenatal depression effects on the fetus and the newborn. *Infant Behaviour and Development*. 27, 216-229.
- Field, T., Hernandez-Reif, M., Diego, M., Gil, K., & Vera, Y. (2005). Prenatal maternal cortisol, fetal activity and growth. *International Journal of Neuroscience*, 115, 423-429.
- Figueiredo, B., A. Pacheco, A., & R. Costa, R. (2007). Depression during pregnancy and the postpartum in adolescent and adult Portuguese mothers. *Archives of Women's Mental Health*, 10, (3), 1434-1816.
- Flying Start (2007). www.flyingstart.co.uk
- Foreman, D.R., O'Hara, M.W., Stuart, S., Gorman, L.L., Larsen, K.E. & Coy, K.E. (2007). Effective treatment for postpartum depression is not sufficient to improve the developing mother-child relationship. *Development and Psychopathology*, 19, 585-602
- Frank, D.A., Baucher, H., Parker, S., Huber, A.M., Kyei-Aboagye, K., Cabral, H, Zuckerman, B. (1990). Neonatal body proportionality and body composition after in utero exposure to cocaine and marijuana. *Journal of Pediatrics*, 117, 622-626.
- Furstenberg, F.F., Jr., Brooks-Gunn, J., & Morgan, S.P. (1987). Adolescent mothers and their children in later life. *Family Planning Perspectives*, 19, 142-151.
- Furstenberg, F.F., Jr. (1992). Teenage childbearing and cultural rationality: A thesis in search of evidence, *Family Relations*, 41, 239-243.
- Furstenberg, F. F., Jr., Hughes, M. E., & Brooks-Gunn, J. (1993). The next generation: The children of teenage mothers growing up. In M. K. Rosenheim

- & M. F. Testa (Eds.). *Early parenthood and coming of age in the 1990's* (pp. 119-135). Rutgers University Press: New Brunswick, NJ.
- Furstenberg, F. F., Jr. (2003). Teenage childbearing as a public issue and private concern. *Annual Review of Sociology*, 29, 23-29.
- Galler, J.R. Harrison, R.H., Ramsey, F., Forde, V., & Butler, S.C. (2000). Maternal depressive symptoms affect infant cognitive development in Barbados. *Journal of Child Psychology and Psychiatry*, 41, 747-757.
- Gavin, N.I., Gaynes, B.N., Lohr, K.N., Meltzer-Brody, S., Gartlehner, G., Swinson, T. (2005). Perinatal Depression. A systematic review of prevalence and incidence. *American Journal of Obstetrics and Gynaecologists*, 106, (5), 1071-1083.
- Gest, S.D., Mahoney, J.L., & Cairns, R.B. (1999). A developmental approach to prevention research: Configural antecedents of early parenthood. *American Journal of Community Psychology*, 27, 543-565.
- Gitau, R., Cameron, A., Fisk, N. M., Glover, V. (1998). Fetal exposure to maternal cortisol. *Lancet*, 352, 707-708.
- Goldberg, D. (2006). The aetiology of depression. *Psychological Medicine*, 36, 1341-1347.
- Goldberg, D., Cooper, B., Eastwood, M.T. Kedward, H.B. & Shepherd, M. (1970). A psychiatric interview for use in community surveys. *British Journal of Preventive Social Medicine*, 24, 18-23.
- Goldschmidt, L., Day, N.L., Richardson, G.A. (2000). Effects of prenatal marijuana exposure on child behaviour problems at age 10. *Neurotoxicology & Teratology*, 22, 325-336.

- Goldthorpe, J.H., & Hope, K. (1974). *The social grading of occupations*. Oxford: Oxford University Press.
- Golombok, S. (2002). Parenting and contemporary reproductive technologies. In M.H. Bornstein, (Eds.). *Handbook of parenting. Vol. 3: Status and social conditions of parenting* (2nd ed., pp. 339-360). Mahwah, NJ: Erlbaum.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.
- Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study of the validity of the self-report version. *European Child and Adolescent Psychiatry*, 7, 125-130.
- Goodman, R. (1999). The extended version of the strengths and difficulties questionnaire as a guide to child psychiatric caseness and consequent burden. *Journal of Child Psychology and Psychiatry*, 40, 791-799.
- Goodman, R., & Scott, S. (1999). Comparing the Strengths and Difficulties Questionnaire and the Child Behaviour Checklist: Is small beautiful? *Journal of Abnormal Child Psychology*, 27, 17-24.
- Goodman, S.H., & Gotlib, I.H., (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*, 106, 458-490.
- Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of Child the American Academy of Child and Adolescent Psychiatry*, 40, (11), 1337-1345.
- Goodyer, I.M., Herbert, J., Altham, P.M., Pearson, J., Sechler, S.M., Shier, H.M. (1996). Adrenal secretion during major depression in 8-to 16-year olds. Altered diurnal rhythms in salivary cortisol and dehydroepiandrosterone (DHEA) at presentation. *Psychological Medicine*, 26, 245-256.

- Goodyer, I.M., Tamplin, A., Herbert, J., Altham, P.M. (2000). Recent life events, cortisol, dehydroepiandrosterone and the onset of major depression in high risk adolescents. *British Journal of Psychiatry*, 177, 499-504.
- Gotlib, I.H., Whiffen, V.E., Wallace, P.M. & Mount, J.H. (1991). Prospective investigation of postpartum depression: factors involved in onset and recovery. *Journal of Abnormal Psychology*, 100 (2), 122-132.
- Gulliver, P.H. (1968). Age differentiation. In D.L. Sills, (Eds.). *International Encyclopedia of the Social Sciences*. Macmillan and Free Press: New York.
- Grant, J., Hoorens, S., Sivadasan, S., Van Het Loo, M., DaVanzo, J., Hale, L., Gibson, S., & Butz, W. (2004), *Low fertility and population ageing: Causes, consequences, and policy options*. Rand Corporation. MG-206, UK.
- Grant, J., Hoorens, S., Sivadasan, S., Van Het Loo, M., Davanzo, J., Hale, L., & Butz, W. (2006). Trends in European fertility: Should Europe try to increase its fertility rate.....or just manage the consequences? *International Journal of Andrology*, 29, 17-24.
- Gueorguieva, R.V., Carter, R.L., Ariet, M., Roth, J., Mahan, C.S., & Resnick, M.B. (2001). Effect of teenage pregnancy on educational disabilities in kindergarten. *American Journal of Epidemiology*, 154 (3), 212-220.
- Halligan, S.L., Murray, L., Martins, C., & Cooper, P. (2007). Maternal depression and psychiatric outcomes in adolescent offspring: A 13-year longitudinal study. *Journal of Affective Disorders*, 97, 145-154.
- Hand, I, L., Noble, L., North, A., Kim, M., Yoon, J, J. (2006). Psychiatric symptoms among postpartum women in an urban hospital setting. *American journal of Perinatology*. 23, (6) 329-334.
- Hannaford, P.C., Smith, B.H., & Eliot, A.M. (2006). *Family Practice*, 23, 1-7.

- Hardy, J. B., Astone, N.M., Brooks-Gunn, J., Shapiro, S., & Miller, T. L. (1998). Like mother, like child: Intergenerational patterns of age at first birth and associations with childhood and adolescent characteristics and adult outcomes in the second generation. *Developmental Psychology*, 34, 1220-1232.
- Harlaar, N., Dale, P.S., Plomin, R. (2007). From learning to read to reading to learn: substantial and stable genetic influence. *Child Development*, 78, (1), 116-131.
- Haveman, R.H., Wolfe, B., & Peterson, E. (1997). "Children of Early Childbearers as Young Adults. In R. Maynard, (Eds.). *Kids Having Kids: Economic costs and social consequences of teen pregnancy*. Washington, DC: The Urban Institute Press.
- Hay, D.F. (1997). Postpartum depression and cognitive development. In L. Murray & P. Cooper (Eds.), *Postpartum depression and child development* (pp. 85-110). New York: Guilford Press.
- Hay, D.F., & Kumar, R. (1995). Interpreting the effects of mothers' postnatal depression on children's intelligence: A critique and a reanalysis. *Child Psychiatry and Human Development*, 25, 165-181.
- Hay, D.F., & Pawlby, S. (2003). Prosocial development in relation to children's and mothers' psychological problems. *Child Development*, 74, 1295-1308.
- Hay, D.F., Pawlby, S., Angold, A., Harold, G.T., & Sharp, D. (2003). Pathways to violence in the children of mothers who were depressed postpartum. *Developmental Psychology*, 39, 1083-1094.
- Hay, D.F. Pawlby, S., Sharp, D., Asten, P., Mills, A., & Kumar, R. (2001). Intellectual problems shown by 11-year-old children whose mothers had postnatal depression. *Journal of Child Psychology and Psychiatry*, 42, 871-889.

- Hay, D.F., Pawlby, S., Waters, C.S., & Sharp, D. (2008). Antepartum and postpartum exposure to maternal depression: different effects on different adolescent outcomes. *Journal of Child Psychology and Psychiatry*, 49, 10, 1079-1088.
- Heck, K.E., Schoendorf, K.C., Ventura, S.J., & Kiely, J.L. (1997). Delayed childbearing by education level in the United States, 1969-1994. *Maternal and Child Health Journal*, 1, 81-88.
- Henderson, J.J., Evans, S.F. Straton, J.A.Y., Priest, S.R., & Hagan, R. (2003). Impact of postnatal depression on breastfeeding. *Birth*, 30 (3), 175-180.
- Hendrick, V., Altshuler, L., Strouse, T. & Grosser, S. (2000). Postpartum and Non-postpartum depression: differences in presentation and response to pharmacologic treatment. *Depression and Anxiety*, 11, 66-72.
- Henry, C., Kabbaj, M., Simon, H., Moal, M.L., & Maccari, S. (1994). Prenatal stress increases the hypothalamic-pituitary-adrenal axis response in young and adult rats. *Journal of Neuroendocrinology*, 6, 341-345.
- Heron, J., O'Connor, T.G., Evans, J., Golding, J. & Glover, V. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders*, 80, 65-73.
- Hess, E.H. (1959). Imprinting. *Science*, 130, 133-141.
- Hobcraft, J., & Kieman, K.E. (2001). Childhood poverty, early motherhood and adult social exclusion. *British Journal of Sociology*, 52 (3), 495-517.
- Hobfoll, S.E., Ritter, C., Lavin, J., Hulsizer, M.R., Cameron, R.P. (1995). Depression prevalence and incidence among inner-city pregnant and postpartum women. *Journal of Consulting and Clinical Psychology*, 63, 445-53.

- Hofferth, S.L., Reid, L. (2002). Early Childbearing and Children's Achievement and Behaviour over Time, *Perspectives on Sexual and Reproductive Health*, 34 (1), 41-49.
- Hoffman, S.M., Foster, E.M., & Furstenberg, F.F. (1993). Re-evaluating the costs of teenage childbearing. *Demography*, 30, 1-13.
- Höhn, C. (1990). International transmission of population policy experience in Western Europe. In United Nations Department of International Economic and Social Affairs (Eds.). *International transmission of population policy experience*, (pp. 145-158). New York: United Nations.
- Horwitz, S.M., Klerman, L.V., Kuo, H.S., & Jekel, J.F. (1991). Intergenerational transmission of school-age parenthood. *Family Planning Perspectives*, 23, 168-177.
- Hotz, V.J., McElroy, S.W., & Sanders, S.G. (1997). The costs and consequences of teenage childbearing for mothers. In R.A. Maynard (Ed.), *Kids having kids: Economic costs and social consequences of teen pregnancy* (pp. 55-94). Washington, DC: Urban Institute Press.
- Hudson, D.B., Elak, S. M., Campbell-Grossman, C. (2000). Depression, self-esteem, loneliness, and social support in adolescent mothers participating in the New Mothers' Network. *Adolescence* 35 (139), 443-453.
- Huizink, A.C., Robles de Medina, P.R., Mulder, E.J.H., Visser, G.H.A., & Buitelaar, J.K. (2002). Psychological measures of prenatal stress as predictor of infant temperament. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 1078-1085.

- Huizink, A.C., Robles de Medina, P.G., Mulder, E.J.H., Visser, G.H.A., & Buitelaar, J.K. (2003). Stress during pregnancy is associated with developmental outcome in infancy. *Journal of Child Psychology and Psychiatry*, 44, 810-818.
- Huizink, A.C., & Mulder, E.J.H. (2006). Maternal smoking, drinking or cannabis use during pregnancy and neurobehavioural and cognitive functioning in human offspring. *Neuroscience and Biobehavioural Reviews*, 30, 24-41.
- Jaffee, S.R., Caspi, A., Moffitt, T.E., Belsky, J., & Silva, P. (2001). Why are children born to adolescent mothers at risk for adverse outcomes in young adulthood? Results from a 20-year longitudinal study. *Development and Psychopathology*, 13, 377-397.
- Jaffee, S.R. (2002). Pathways to adversity in young adulthood among early childbearers. *Journal of Family Psychology*, 16 (1), 38-49.
- Jenkins, J.M. & Curwen, T. (2008). Change in adolescents' internalizing symptoms as a function of sex and the timing of maternal depressive symptomatology. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47 (4), 399-405.
- Jesse, D.E., Walcott-McQuigg, J., Mariella, A., & Swanson, M.S. (2005). Risk and protective factors associated with symptoms of depression in low-income African American and Caucasian women during pregnancy. *Journal of Midwifery & Women's Health*, 50 (5), 405-410.
- Julvez, J., Ribas-Fito, N., Torrent, M., Forns, M., Garcia-Esteban, R., & Sunyer, J. (2007). Maternal smoking habits and cognitive development of children at age 4 years in a population-based birth cohort. *International Journal of Epidemiology*, 1-8.

- Kalil, A., & Kunz, J. (2002). Teenage childbearing, marital status, and depressive symptoms in later life. *Child Development, 73* (6), 1748-1760.
- Kahn, J.R., & Anderson, D.E. (1992). Intergenerational patterns of teenage fertility. *Demography, 29* (1), 39-57.
- Kelly, R.H., Russo, J., & Katon, W. (2001). Somatic complaints among pregnant women cared for in obstetrics: normal pregnancy or depressive and anxiety symptom amplification revisited? *General Hospital Psychiatry, 23*, 107-113.
- Kendler, K.S., Kessler, R.C., Walters, E.E., MacLean, C., Neale, M.C., Heath, A.C., & Eaves, L.J. (1995). Stressful life events, genetic liability, and onset of depression in women. *American Journal of Psychiatry, 152*, 833-842.
- Kendler, K.S., Gardner, C.O., Gatz, M., Pedersen, N.L. (2006). The sources of comorbidity between major depression and generalised anxiety disorder in a Swedish national twin sample. *Psychological Medicine, 37*, 353-462.
- Kendler, K.S., M.D., Gatz, M., Gardner, C.O., & Pedersen, N.L. (2007). A Swedish National Twin Study of Lifetime Major Depression. *American Journal of Psychiatry, 163*, 109-114.
- Kessen, W. (1960). Research design in the study of developmental problems. In P. Mussen (Eds.), *Handbook of research methods in child development*. New York: Wiley.
- Kessen, W., Haith, M.M., & Salapatek, P.H. (1970). Infancy. In P. Mussen (Eds.), *Carmichael's manual of child psychology*. New York: Wiley.
- Kessler, R., McGonagle, K.A., Zhao, S., Nelson, C.D., Hughes, M., Eshelman, S., Wittchen, H.U., & Kendler, K.S. (1994). Lifetime and twelve month prevalence of *DSM-III-R* psychiatric disorders in the United States: Results from the National Comorbidity Survey. *Archives of General Psychiatry, 151*, 8-19.

- Kiernan, K.E. (1980). Teenage motherhood—Associated factors and consequences—the experiences of a British cohort. *Journal of Biosocial Science*, 12, 393-405.
- Kiernan, K.E. (1997). Becoming a young parent: A longitudinal study of associated factors. *British Journal of Sociology*, 48 (3), 406-428.
- Kim-Cohen, J., Moffitt, T.E., Taylor, A., Pawlby, S.J. & Caspi, A. (2005). Maternal depression and child antisocial behaviour: Nature and nurture effects. *Archives of General Psychiatry*, 62, 173-181.
- King, J.A. (1958). Parameters relevant to determining the effect of early experience upon the adult behaviour in animals. *Psychological Bulletin*, 55, 46-58.
- Kirchengast, S., & Hartmann, B. (2003). Impact of maternal age and maternal somatic characteristics on newborn size. *American Journal of Human Biology*, 15 (2), 220-228.
- Kitamura, T., Shima, S., Sugawara, M. & Toda, M.A. (1996). Clinical and psychosocial correlates of antenatal depression: a review. *Psychotherapy and Psychosomatics*, 65, 117-123.
- Kitamura, T., Sugawara, M., Shima, S., & Toda, M.A. (1999). Childhood adversities and depression: II. Parental loss, rearing, and symptom profile of antenatal depression. *Achieves of Women's Mental Health*, 1, 175-182.
- Klipinger, D.H., Lundberg, S., & Plotnick, R.D. (1995). Adolescent fertility and the educational attainment of young women. *Family Planning Perspectives*, 27, 23-28.
- Kovacs, M., Krol, R.S.M., & Voti, L. (1994). Early onset psychopathology and the risk for teenage pregnancy among clinically referred girls. *Journal of American Academy of Child and Adolescent Psychiatry*, 33 (1), 106-113.

- Kramer, M.S., Aboud, F., Mironova, E., Vanilovich, I., Platt, R.W., Matush, L., Igumnov, S., Fombonne, E., Bogdnovich, N., Ducruet, T., Collet, J.P., Chalmers, B., Hodnett, E., Davidovsky, S., Skugarevsky, O., Tromfimovich, S., Skugarevsky, O., Tromfimovich, O., Kozlova, L., & Sharp, S. (2008). Breastfeeding and child cognitive development. *Achieves of General Psychiatry*, 65 (5), 578-584.
- Kumar, R., & Robson, K.M. (1984). A prospective study of emotional disorders in childbearing women. *British Journal of Psychiatry*, 144, 35-47.
- Lamb, M. E., Hopps, K., & Elster, A. B. (1987). Strange situation behavior of infants with adolescent mothers. *Infant Behavior and Development*, 10, 39-48.
- Larsson, C., Sydsjo, G., & Josefsson, A. (2004). Health, sociodemographic data, and pregnancy outcome in women with antepartum depressive symptoms. *American College of Obstetrics and Gynaecologists*, 104, (3), 459-466.
- Lavelli, M., & Poli, M. (1998). Early mother-infant interaction during breast- and bottle-feeding. *Infant Behaviour and Development*, 21, 667-683.
- Leadbeater, B., Bishop, S. J., & Raver, C. C. (1996). Quality of mother-toddler interactions, maternal depressive symptoms, and behavior problems in preschoolers of adolescent mothers. *Developmental Psychology*, 32, 280-288.
- Leadbeater, B. J.R., & Linares, O. (1992). Depressive symptoms and neglect in Puerto Rican adolescent mothers in the first three years post partum. *Development and Psychopathology*, 4, 451-468.
- Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC Psychiatry*, 8, (24), 1-11.
- Logsdon, M, C., Birkimer, J, C., Simpson, T., & Looney, S. (2005). Postpartum depression and social support in adolescents. *JOGNN*, 36, 46-54.

- Lorenz, K. (1970). Companions as factors in the bird's environment. In K. Lorenz (Ed.), *Studies on animal and human behavior* (Vol.1, pp.101-258). Cambridge, MA: Harvard University Press. (Original work published 1935).
- Lucas, M., Morley, R., Cole, T., Lister, G., & Leeson Payne, C. (1992). Breast milk and subsequent intelligence quotient in children born pre-term. *Lancet*, 339, 261-264.
- Lundy, B.L., Jones, N.A., Field, T., Nearing, G., Davalos, M., Pietro, P.A., Schanberg, S., Kuhn, C. (1999). Prenatal depression effects on neonates. *Infant Behaviour and Development*, 22, (1), 119-129.
- Manlove, J. (1997). Early motherhood in an intergenerational perspective: The experiences of a British cohort. *Journal of Marriage and the Family*, 59, 263-279.
- Marcus, S.M., Flynn, H.A., Blow, F.C., & Barry, K.L. (2003). Depressive symptoms among pregnant women screened in obstetrics settings. *Journal of Women's Health*, 12 (4), 373-380.
- Martin, J.A., Kochanek, K.D., Strobino, D.M., Guyer, B., & MacDorman, M.F. (2005). Annual summary of vital statistics—2003. *Pediatrics*, 115 (3), 619-634.
- Maser, J.D. & Cloninger, C.R. (1990). Comorbidity of anxiety and mood disorders: introduction and overview. In J.D. Maser JD & C.R. Cloinger (Eds.), *Comorbidity of mood and anxiety disorders*. Washington, DC: American Psychiatric Press.
- Maughan, B., & Lindelow, M. (1997). Secular change in psychosocial risks: The case of teenage motherhood. *Psychological Medicine*, 27, 1129-1144.

- Maynard, R. (1997). *Kids having kids: Economic costs and social consequences of teen pregnancy*. Washington, DC: Urban Institute Press.
- McGee, R., Williams, S., Kashani, J. H., & Silva, P.A. (1983). Prevalence of self-reported depressive symptoms and associated social factors in mothers in Dunedin. *British Journal of Psychiatry*, 143, 473-479.
- McMahon, C.A., Barnett, B., Kowalenko, N.M., & Tennant, C.C. (2006). Maternal attachment state of mind moderates the impact of postnatal depression on infant attachment. *Journal of Child Psychology and Psychiatry*, 47, (7), 660-669.
- Mellor, D. (2004). Furthering the use of the strengths and difficulties questionnaire: Reliability with younger child respondents. *Psychological Assessment*, 16, (4), 396-401.
- Miller, C.L., Miceli, P.J., Whitman, T.L., & Borkowski, J.G. (1996). Cognitive readiness to parent and intellectual-emotional development in children of adolescent mothers. *Developmental Psychology*, 32 (3), 533-541.
- Miller-Johnson, S., Winn, D., Cole, J., Maumary-Gremaud, A., Hyman, C., Terry, R., Lochman, J. (1999). Motherhood during the teen years: A developmental perspective on risk factors for childbearing. *Journal of Development and Psychopathology*, 11, 85-100.
- Miner, J.L., & Clarke-Stewart, K.A. (2008). Trajectories of externalizing behaviour from age 2 to age 9: Relations with gender, temperament, ethnicity, parenting, and raters. *Development Psychology*, 44 (3), 771-786.
- Mirowsky, J. (2002). Parenthood and health: The pivotal and optimal age at first birth. *Social Forces*, 81 (1), 315-349.

- Moberg, D.P., & Hahn, L. (1991). The adolescent drug involvement scale. *Journal of Adolescent Chemical Dependency*, 2, 75-88.
- Moffitt, T.E., Caspi, A., Harrington, H., Milne, B.J., Melchior, M., Goldberg, D. (2007a). Generalizes anxiety disorder and depression: childhood risk factors in a birth cohort followed to age 32. *Psychological Medicine*, 37, 441-452.
- Moffitt, T.E., Harrington, H., Caspi A., Kim-Cohen, J., Goldberg, D., Gregory, A.M., Poulton, R. (2007b). Depression and generalized anxiety disorder: cumulative and sequential comorbidity in a birth cohort followed prospectively to age 32 years. *Achieves of General Psychiatry*, 64, 651-660.
- Moffitt, T. E., & the E-Risk Study Team. (2002). Teen-aged mothers in contemporary Britain. *Journal of Child Psychology and Psychiatry*, 43 (6), 727-42.
- Moore, D, R., & Florsheim, P. (2001). Interpersonal processes and psychopathology among expectant and non-expectant adolescent couples. *Journal of Consulting and Clinical Psychology*, 69 (1), 101-113.
- Moore, K.A., & Snyder, N.O. (1991). Cognitive attainment among firstborn children of adolescent mothers. *American Sociological Review*, 56, 612-624.
- Murray, L. (1992). The impact of postnatal depression on infant development. *Journal of Child Psychology and Psychiatry*, 33, 543-561
- Murray, L., Kempton, C., Woolgar, M., & Hooper, R. (1993). Depressed mother's speech to their infants and its relation to infant gender and cognitive development. *Journal of Child Psychology and Psychiatry*, 34, 1083-1101.
- Murray, L. (1997). Editorial: Postpartum depression and child development. *Psychological Medicine*, 27, 253-260.
- Murray, L., & Cooper, P.J. (1997). *Postpartum Depression and Child Development*. London: Guilford Press.

- Murray, L., Sinclair, D., Cooper, P.J., Ducournau, P., Turner, P., & Stein, A. (1999). The socioemotional development of 5-year old children of postnatally depressed mothers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 40, 1259-1271.
- Murray, L., Woolgar, M., Cooper, P.J., & Hipwell, A. (2001). Cognitive Vulnerability in 5-year old Children of Depressed Mothers. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 42, (7), 891-899.
- Nagin, D.S., Pogarsky, G., & Farrington, D.P. (1997). Adolescent mothers and the criminal behaviour of their children. *Law and Society Review*, 31, 137-162.
- National Institute for Health and Clinical Excellence, (2007). Clinical Practice Guideline Number 45. Antenatal and Postnatal Mental Health. <http://www.nice.org.uk>
- National Health Service. (2004/5). *Maternity statistics*.
- Nebot, M., Borrell, C., Villalbi, J.R. (1997). Adolescent motherhood and socio-economic factors. An ecological approach. *European Journal of Public Health*, 7, 144-148.
- Neugarten, B.L., Moore, J.W., & Lowe, J.C. (1965). Age norms, age constraints, and adult socialization. *The American Journal of Sociology*, 70 (6), 710-717.
- Nonacs, R., & Cohen, L.S. (2002). Depression during pregnancy: Diagnosis and treatment options. *Journal of Clinical Psychiatry*, 63, 24-30.
- O'Brien, B. & Newton, N. (1991). Psyche versus soma: historical evolution of beliefs about nausea and vomiting during pregnancy. *Journal of Psychosomatic Obstetrics & Gynecology*, 12 (2), 91-120.
- O'Connor, T.G., Rutter, M., Beckett, C., Keaveney, L., Krepner, J., & The ERA Study Team. (2000). The effects of global severe privation on cognitive

competence: Extension and longitudinal follow-up. *Child Development*, 71, 376- 390.

O'Connor, T.G., Heron, J., Golding, J., Beveridge, M., & Glover, V. (2002). Maternal antenatal anxiety and children's behaviour/emotional problems at 4 years. *British Journal of Psychiatry*, 180, 502-508.

O'Connor, T.G., Heron, J., Golding, J., Glover, V. & the ALSPAC Study Team. (2003). Maternal anxiety and behavioural/emotional problems in children: A test of a programming hypothesis. *Journal of Child Psychology and Psychiatry*, 44, 1025-1036.

O'Hara, M., Zekoski, E., Phillips, L., & Wright, E. (1990). Controlled prospective study of postpartum mood disorders: Comparison of childbearing and non-childbearing women. *Journal of Abnormal Psychology*, 99, 3-15.

O'Hara (1997). The nature of postpartum depressive disorders. In L. Murray & P.J. Cooper (Eds.), *Postpartum depression and child development*. London: Guilford Press.

O'Keane V. (2006). Mood disorder during pregnancy: aetiology and management. In V. O'Keane, M. Marsh & G. Seneviratne (Eds.), *Psychiatric disorders and pregnancy* (pp. 69-105). London: Taylor & Francis.

Office of National Statistics. (2000). *Social trends pocket book*. London: HMSO.

Office of National Statistics. (2003). <http://www.statistics.gov.uk>.

Office of National Statistics (2006). www.statistics.gov.uk

Office of National Statistics. (2007). Birth Statistics. Review of the registrar general on births and patterns of family building in England and Wales, 2005. *Office of National Statistics*. London.

Office of National Statistics. (2007b). Households and families. *Social Trends*, 37,

20-22.

- Olausson, P.O., Haglund, B., Weitoft, G.R., & Cnattingius, S. (2001). Teenage childbearing and long-term socioeconomic consequences: A case study in Sweden. *Family Planning Perspectives*, 33, 70–74.
- Olds, D. (1997). Tobacco exposure and impaired development: A review of the evidence. *Mental Retardation and Developmental Disabilities Research Reviews*, 3, 257-269.
- Olds, D.L., Sadler, L., Kitzman, H. (2007). Programmes for parents of infants and toddlers: recent evidence from randomized trials. *Journal of Child Psychology and Psychiatry*, 48, 355-391.
- Pawlby, S., Hay, D.F., Sharp, D., Waters, C.S., & O’Keane, V. (2008). Antenatal depression predicts depression in adolescent offspring: Prospective longitudinal community-based study. *Journal of Affective Disorders*, (in press).
- Pajulo, M., Savonlahti, E., Sourander, A., Helenius, H., & Phia, J. (2001). Antenatal depression, substance dependency and social support. *Journal of Affective Disorders*, 65, (1): 9-17.
- Pardo, R.A., Nazer, J., & Cifuentes, L. (2003). Prevalence of congenital malformations at birth among teenage mothers. *Revista Medica De Chile*, 131 (10), 1165-1172.
- Pelaez-Nogueras, M., Field, T., Cigales, M., Gonzalez, A., & Clasky, S. (1994). Infants of depressed mothers show less depressed behaviour with their nursery teachers. *Infant Mental Health Journal*, 15 (4), 358-367.
- Petrill, S. A., Lipton, P. A., Hewitt, J. K., Plomin, R., Cherny, S. S., Corley, R., & DeFries, J. C. (2004). Genetic and environmental contributions to general

cognitive ability through the first 16 years of life. *Developmental Psychology*, 40(5) 805-812.

Pevalin, D. (2003). Outcomes in childhood and adulthood by mother's age at birth: Evidence from the 1970 British Cohort Study. *Working paper 2003-31*, ISER, University of Essex, Colchester.

Plomin, R. (1995). Genetics and children's experiences in the family. *Journal of Child Psychology and Psychiatry*, 36, 33-68.

Pogarsky, G., Thornberry, T.P., & Lizotte, A.J. (2006). Developmental outcomes for children born of young mothers. *Journal of Marriage and the Family*, 68 (2), 332-344.

Pogarsky, G., Lizotte, A.J., & Thornberry, T.P. (2003). The delinquency of children born to young mothers: Results from the Rochester Youth Development Study. *Criminology*, 41 (4), 1249-1286.

Pomerleau, A., Scuccimarri, C., & Malcuit, G. (2003). Mother-infant behavioural interactions in teenage and adult mothers during the first six months postpartum: Relations with infant development. *Infant Mental Health Journal*, 24 (5), 495-509.

Prodromidis, M., Abrams, S., Field, T., Scafidi, F., Rahdert, E. (1994). Psychosocial stressors among depressed adolescent mothers. *Adolescence* 29 (114), 331-343

Quinlivan, J, A., Tan, L, H., Steele, A., Black, K. (2004). Impact of demographic factors, early family relationships and depressive symptomatology in teenage pregnancy. *Australian and New Zealand Journal of Psychiatry*, 38, 197-203.

Quinn, P.J., O'Callaghan, M., Williams, G.M., Najman, J.M., Andersen, M.J. & Bor, W. (2001). The effect of breastfeeding on child development at 5 years: a cohort study. *Journal of Paediatric Child Health*, 37 (5), 465-469.

- Ramchandani, P., Stein, A., Evans, J., O'Connor, T., & the ALSPAC team. (2005). Paternal depression in the postnatal period and child development: a prospective population study. *Lancet*, 365, 2201-2205.
- Ramchandani, P., O'Connor, T.G., Evans, J., Heron, J., Murray, L., & Stein, A. (2008). The effects of pre-and postnatal depression in fathers: a natural experiment comparing the effects of exposure to depression on offspring. *Journal of Child Psychology and Psychiatry*, 49, (10), 1069-1078.
- Rahman, A., Iqbal, Z., & Harrington, R. (2003). Life events, social support and depression in childbirth: perspectives from a rural community in the developing world. *Psychological Medicine*, 33, 1161-1167.
- Reijneveld, S.A. de Kleine, M.J.K. van Baar, A.L., Kollee, L.A.A., Verhaak, C.M., Verhulst, F.C. & Verloove-Vanhorick, S.P. (2006). Behavioural and emotional problems in very preterm and very low birthweight infants at age 5 years. *Archives of Disease in Childhood – Fetal and Neonatal Edition*, 91, 423-428.
- Reis, J. (1987). Correlates of depression according to maternal age. *Journal of Genetic Psychology*, 149, 535-545.
- Rich-Edwards, J.W., Kleinman, K., Abrams, A. Harlow, B.L., McLaughlin, T.J., Joffe, H. & Gillman, M.W. (2006). Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. *Journal of Epidemiology and Community Health*, 60, 221-227.
- Richards, M., Hardy, R., Kuh, D. & Wadsworth, M.E.J. (2001). Birth weight and cognitive function in the British 1946 birth cohort: longitudinal population based study. *British Medical Journal*, 322, 199-203.

- Robertson, E., Grace, S., Wallington, T., & Stewart, D.E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry*, 26, 289-295.
- Robson, K., & Berthoud, R. (2003). Teenage motherhood in Europe: A multi-country analysis of socioeconomic outcomes. *European Sociological Review*, 19 (5), 451-466.
- Rochebrochard, E., & Thonneau, P. (2002). Paternal and maternal age are risk factors for miscarriage; results of a multi-centre European study. *Human Reproduction*, 17 (6), 1649-1656.
- Rodgers, M.M., Peoples-Sheps, M.D., & Suchindran, C. (1996). Impact of a social support program on teenage prenatal care use and pregnancy outcomes. *Journal of Adolescent Health*, 19, 132-140.
- Romano, E., Zoccolillo, M., Paquette, D. (2006). Histories of child maltreatment and psychiatric disorder in pregnant adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*. 45, 329-336.
- Roy, M.A., Neale, M.C., Pederson, N.L., Mathe, A.A., Kendler, K.S. (1995). A twin study of generalized anxiety disorder and major depression. *Psychological Medicine*, 25, 1037-1049.
- Royal College of Obstetricians and Gynecologists. (2008). www.rcog.org.uk
- Rubertsson, C., Wickberg, B., Gustavsson, P. & Radestad, I. (2005). Depressive symptoms in early pregnancy, two months and one year postpartum-prevalence and psychosocial risk factors in a national Swedish sample. *Archives of Women's Mental Health*, 8, 97-104.
- Russell, S.T. (2002). Childhood developmental risk for teen childbearing in Britain. *Journal of Research on Adolescence*, 12 (3), 305-324.

- Rutter, M., & Silberg, J. (2002). Gene-environment interplay in relation to emotional and behavioural disturbance. *Annual Review of Psychology*, 53, 463-490.
- Rutter, M., Moffitt, T.E., & Caspi, A. (2006). Gene-environment interplay and psychopathology: multiple varieties but real effects. *Journal of Child Psychology and Psychiatry*, 47, (3), 226-261.
- Schmidt, M.R., Wiemann, C.M., Rickert, V.I., O'Brian-Smith, E. (2006). Moderate to severe depressive symptoms among adolescent mothers followed four years postpartum. *Journal of Adolescent Health*, 38, 712-718.
- Schneier, F.R., Blanco, C., Campeas, R., Lewis-Fernandez, R., Lin, S-H., Marshall, R., Schmidt, A.B., Sanchez-Lacay, J., Simpson, H.B., Liebowitz, M.R. (2003). Citalopram treatment of social anxiety disorder with comorbid depression. *Depression and Anxiety*, 17, 191-196.
- Scottish Intercollegiate Guidelines Network, SIGN. (2002). www.sign.ac.uk.
- Secco, M, L., Profit, S., Kennedy, E., Walsh, A., Letourneau, N., Stewart, M. (2007). Factors affecting postpartum depressive symptoms of adolescent mothers. *JOGNN*. 36, 47-54.
- Seto, M., Cornelius, M.D., Goldschmidt, L., Morimoto, K., & Day, N.L. (2005). Long-term effects of chronic depressive symptoms among low-income childrearing mothers, *Maternal and Child Health Journal*, 9, (3), 263-271.
- Shanok, A, F., Miller, L. (2005). Fighting and depression among poor pregnant adolescents. *Journal of Reproductive and Infant Psychology*, 23, (3), 207-218.
- Shanok, A, F., Miller, L. (2007). Depression and treatment with inner city pregnant and parenting teens. *Archives of Women's Mental Health*, 10, 199-210.

- Shaw, M., Lawlor, D.A., & Najman, J.M. (2006). Teenage children of teenage mothers: Psychological, behavioural and health outcomes from an Australian prospective longitudinal study. *Social Science & Medicine*, 62, 2526-2539.
- Snaith, R.P., Bridge, G., & Hamilton, M. (1971). The Leeds scales for the self-assessment of anxiety and depression. *British Journal of Psychiatry*, 128, 156-165.
- Social Exclusion Unit. (1999). *Teenage pregnancy*. Report to the Prime Minister. London: HMSO.
- Sohr-Preston, S.L., & Scaramella, L.V. (2006). Implications of maternal depressive symptoms for early cognitive and language development. *Clinical Child and Family Psychology*, 9 (1), 65-83
- Solomon, R.L., & Lessac, M.S. (1968). A control group design for experimental studies of developmental processes. *Psychological Bulletin*, 70, 145-160.
- Sommer, K.S., Whitman, T.L., Borkowski, J.G., Gondoli, D.M, Burke, J., Maxwell, S.E., & Weed, K. (2000). Prenatal maternal predictors of cognitive and emotional delays in children of adolescent mothers. *Journal of Adolescence*, 35 (137), 87-112.
- Spieker, S.J., & Bensley, L. (1994). Roles of living arrangements and grandmother social support in adolescent mothering and infant attachment. *Developmental Psychology*, 30, 102-111.
- Spitzer RL, Endicott J, & Robins E. (1978). *The Schedule for Affective Disorders and Schizophrenia – Lifetime version (SADS-L)* 3rd Ed. New York, Biometric Research.
- Stewart, D.E. & Streiner, D. (1994). Alcohol drinking in pregnancy. *General Hospital Psychiatry*, 16, (6): 406-412.

- Stevens-Simon, C., Kelly, L., & Wallis, J. (2000). The timing of Norplant insertion and postpartum depression in teenagers. *Society of Adolescent Medicine*, 26, 408-413.
- Stevens-Simon, C., Nelligan, D., & Kelly, L. (2001). Adolescents at risk for mistreating their children part II: A home and clinic based prevention program. *Child Abuse & Neglect*, 25 (6), 753-769.
- Suri, R., Altshuler, L., Hellemann, G., Burt, V.K., Aquino, A., & Mintz, J. (2007). Effects of antenatal depression and antidepressant treatment on gestational age at birth and risk of preterm birth. *American Journal of Psychiatry*, 164 (8), 1206-1213.
- Tabachnick, B.G. & Fidell, L.S. (2001). *Using Multivariate Statistics*. (4th edition). London: Allyn & Bacon.
- Teenage Pregnancy Unit. (2007). <http://www.dfes.gov.uk/teenagepregnancy> (accessed September 2007).
- Teenage Pregnancy Independent Advisory Group. (2008). Annual Report. www.everychildmatters.gov.uk/health/teenagepregnancy/tpiag.
- Thornberry, T.P., Smith, C.A., & Howard, G.J. (1997). Risk factors for teenage fatherhood. *Journal of Marriage and the Family*, 59, 505-522.
- Treloar, S.A., Martin, N.G., Bucholz, K.K., Madden, P.A.F, Heath, A.C. (1999). Genetic influences on postnatal depressive symptoms: finding from an Australian twin sample. *Psychological. Medicine*, 29, 645–654.
- Troutman, B. R. & Cutrona, C. E. (1990). Nonpsychotic postpartum depression among adolescent mothers. *Journal of Abnormal Psychology*, 99, 69-78.
- UNICEF. (2001). *A league table of teenage births in rich nations*. Innocenti report card issue No. 3. UNICEF. Florence: Innocenti Research Centre.

- Upchurch, D.M., & McCarthy, J. (1990). The timing of a first birth and high school completion. *American Sociological Review*, 55, 224-234.
- Van den Bergh, B.R.H., & Marcoen, A. (2004). High antenatal maternal anxiety is related to ADHD symptoms, externalising problems, and anxiety in 8- and 9-year olds. *Child Development*, 75 (4), 1085-1097.
- Van den Bergh, B, R.H., Mulder E, J, H., Mennes, M., Glover, V. (2005) Antenatal maternal anxiety and stress and the neurobehavioural development of the fetus and child. Links and possible mechanisms. A review. *Neuroscience and Biobehavioural Reviews*. 29 (2) 237-258.
- Van den Bergh, B.R.H., Mennes, M., Oosterlaan, J., Stevens, V., Stiers, P., Marcoen, A. & Lagage, L. (2005b). High antenatal maternal anxiety is related to impulsivity during performance tasks in 14- to 15-year-olds. *Neuroscience and Biobehavioral Reviews*, 29, 259-269.
- Ventura, S., Martin, J.A., Curtain, S.C., Menacker, F., Hamilton, B.E. (2001). Births: Final data for 1999. *National Vital Statistics Reports*, 49, 1-99.
- Wakschlag, L.S., & Hans, S.L. (2002). Maternal smoking during pregnancy and conduct problems in high-risk: A development framework. *Development and Psychopathology*, 14, 351-369.
- Watcharaseranee, N., Pinchantra, P., & Piyaman, S. (2006). The incidence and complications of teenage pregnancy at Chonburi Hospital. *Journal of the Medical Association of Thailand*, 89 (4), S118-S123.
- Wechsler, D. (1981). *The Wechsler Adult Intelligence Scale Revised (WAIS-R)*. New York: The Psychological Corporation.
- Wechsler, D. (1992). *The Wechsler Intelligence Scale for Children (WISC-III^{UK})*. London: The Psychological Corporation.

- Weinberg, K.M., Tronick, E.Z., Cohn, J.F., Olson, K.L. (1999). Gender differences in emotional expressivity and self-regulation during early infancy. *Developmental Psychology*, 35, (1), 175-188.
- Welberg, L.A., & Seckl, J.R. (2001). Prenatal stress, glucocorticoids and the programming of the brain. *Journal of Neuroendocrinology*, 13, 113-128.
- Welsh Assembly Government. (2006). [http:// www.wales.gov.uk/statistics](http://www.wales.gov.uk/statistics)
- Westdahl, C., Milan, S., Magriples, U., Kershaw, T.S., Rising, S.S., & Ickovics, J.R. (2007). Social support and social conflict as predictors of prenatal depression. *Obstetrics and Gynecology*, 110 (1), 134-140.
- Wiggins, M., Rosato, M., Austerberry, H., Sawtell, M., Oliver, S. (2005). Sure Start Plus National Evaluation: Final Report. *Social Science Research Unit. Institute of Education*. University of London.
- Wisner, K L., Peindl, K. & Hanusa, B. H. (1994). Symptomatology of affective and psychotic illnesses related to childbearing. *Journal of Affective Disorders*, 30, 77-87.
- Whiffen, V.E., & Gotlib, I.H. (1993). Comparison of Postpartum and Nonpostpartum Depression: Clinical Presentation, Psychiatric History, and Psychosocial Functioning. *Journal of Consulting and Clinical Psychology*, 61, (3), 485-494.
- White, A., Freeth, S., & O'Brien, M. (1993). *Infant feeding 1990*. London HMSO.
- Whitman, T.L., Borkowski, J.G., Schellenbach, C.J., & Nath, P. (1987). Predicting and understanding developmental delay of children of adolescent mothers: A multidimensional approach. *American Journal of Mental Deficiency*, 92, 40-56.
- Wilkinson, P., French, R., Kane, R., Lachowycz, K., Stephenson, J., Grundy, C., Jacklin, P., Kingori, P., Stevens, M., & Wellings, K. (2006). *Teenage*

conceptions, abortions, and births in England, 1994-2003, and the national teenage pregnancy strategy. *Lancet*, 368, 1879-1886.

Williams, L.O., & Decoufle, P. (1999). Is maternal age a risk factor for mental retardation among children? *American Journal of Epidemiology*, 149 (9), 814-23.

Wing, J. K., Babor, T., Brugha, T., Burke, J., Cooper, J. E., Giel, R., Jablenski, A., Regier, D. & Sartorius, N. (1990). SCAN. Schedules for Clinical Assessment in Neuropsychiatry. *Archives of General Psychiatry* 47, 589 - 593.

Wohlwill, J.F. (1970). The age variable in psychological research. *Psychological Review*, 77 (1), 49-64.

Woodward, L.J., & Fergusson, D.M. (1999). Early conduct problems and later risk of teenage pregnancy in girls. *Development and Psychopathology*, 11, 127-141.

Woodward, L.J., Fergusson, D.M., & Horwood, J. (2006). Gender differences in the transition to early parenthood. *Development and Psychopathology*, 18, 275-294.

World Health Organisation. (1978). Mental disorders: glossary and guide to their classification in accordance with the ninth revision of the international classification of diseases, *World Health Organisation*, Geneva.

World Health Organization Division of Mental Health. (1992). *WHO SCAN Advisory Committee. SCAN Schedules for Clinical Assessment in Neuropsychiatry, Version 1.0*. Schedules for Clinical Assessment in Neuropsychiatry. Distribution from Training Centres. WHO: Geneva.

Xie, H., Cairns, B.D., & Cairns, R.B. (2001). Predicting teen motherhood and teen fatherhood: Individual characteristics and peer affiliations. *Social Development*, 10, 488-511.

Zuckerman, B.S., Amaro, H., & Beardslee, W. (1987). Mental health of adolescent mothers: the implications of depression and drug use. *Development and Behavioural Pediatrics*, 8 (2), 111-116

Zuckerman, B., Frank, D.A., Hingson, R., Amaro, H., Levenson, S.M., Kayne, H. (1989). Effects of maternal marijuana and cocaine use on fetal growth. *New England Journal of Medicine*, 320, 762-768.

