

**Psychological Maturity and the Transition to Parenthood:  
A Study of Older First-Time Mothers**

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## **Abstract**

In the context of the trend toward delayed parenthood, this research examined whether older maternal age is associated with greater psychological maturity, and whether greater psychological maturity provides any adaptive benefit during the transition to motherhood. A range of outcomes during pregnancy and early parenthood were considered, including psychological adaptation in pregnancy, early postnatal adjustment, maternal mental health, and parenting at seven months.

This research is informed by two theoretical frameworks. The life-course perspective of development proposes that the changing social structure of the life course contributes to shifts in the normative ages of life events and one consequence is that women are delaying parenthood until they have attained other adult milestones and feel psychologically ready. Additionally, the parenting models of Belsky (1984) and Heinicke (1984) propose that while parenting is multiply determined, the psychological characteristics of the parent are the most important determinant, likely to impact parenting both directly and indirectly through other contextual factors.

Participants were enrolled in an Australian prospective study of first-time parenthood with a particular focus on older maternal age. The sample comprised predominantly English-speaking, socio-economically advantaged women living in a metropolitan area, aged between 24 and 43 years who were expecting their first baby. Because of the strong association between older maternal age and declining fertility, the sampling strategy was to oversample older first-time mothers (aged 37 or more) relative to population rates and recruit approximately equivalent numbers of women who had conceived spontaneously or after fertility treatment. Three studies were undertaken using the same group of participants.

In the first study, 240 women (mean age = 32.81 years; 41% conceived after fertility treatment) completed measures of psychological maturity (hardiness, ego development, and ego resiliency), and pregnancy adaptation (maternal fetal attachment and formation of a maternal identity) in the third trimester of pregnancy, and a measure of adjustment to motherhood at 4-6 months postpartum. Structural equation modelling showed age was positively associated with a latent construct of psychological maturity, and psychological maturity was associated with more optimal adaptation in pregnancy and early motherhood. Both psychological maturity and pregnancy adaptation predicted positive postnatal adjustment.

The second study sought to replicate and extend the above findings in relation to maternal mental health across the transition to parenthood, whilst taking account of well documented determinants of perinatal mental health. Participants were 252 women (mean age 32.97 years; 43% conceived after fertility treatment) who completed symptom measures of anxiety, depression and emotional health in pregnancy and again at 4-6 months postpartum. Using the same latent construct of psychological maturity, structural equation modelling showed age-related maturity was related to more optimal mental health in pregnancy and the early months of motherhood directly, and indirectly through contextual factors associated with postnatal mental health, specifically maternal perceptions of an easier infant and a more supportive partner.

The final study, in a subset of the larger sample, examined relations among maternal age and the observed quality of maternal-infant interaction at 7-months assessed in two ways: ratings of the mother's sensitivity and responsiveness to her infant's cues, and mind-mindedness, the mother's tendency to attribute mental states to her infant, while also considering whether any age effects were attributable to psychological factors, specifically psychological maturity and parenting cognitions.



Participants were 143 mothers (mean age 33.4 years; 41% conceived after fertility treatment) and their first-born infants. Path analysis showed maternal age had both direct and indirect associations with maternal interactive behaviour. Older mothers made more comments about their infants' mental states. They were also more sensitive, however this effect was indirect and explained by greater psychological maturity (hardiness) and a more internal locus of control with regards to parenting. Results suggest that both maternal age and psychological maturity are important contributors to responsive mother-infant interactions.

In all three studies, potentially confounding contextual factors associated with older motherhood were included in the models tested, and the relationships established in these models were examined to confirm that they applied regardless of mode of conception (fertility treatment or spontaneous).

Overall, the results of this research suggest that older first-time mothers are more psychologically mature, that this maturity contributes to positive adjustment across the transition to parenthood and confers some advantages for parenting in the first postnatal year.

### **Certification by Candidate**

I certify that the work in this thesis entitled “Psychological Maturity and the Transition to Parenthood: A Study of Older First-time Mothers” has not previously been submitted for a degree, nor has it been submitted as part of the requirements of a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and it has been written by me. Any help and assistance that I have received in my research work and the preparation of the thesis itself have been appropriately acknowledged.

In addition, I certify that all information sources and literature used are indicated in the thesis.

The research presented in this thesis was approved by the Macquarie University Ethics Committee (Human Research) on 29 November 2007 under protocol number HE23FEB2007-R04994 (see Appendix A).

Anna-Lisa Camberis

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## **Chapter 1: Overview**

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*“Age and maturity helps. I'm glad I waited because I am better able to cope with the physical and emotional demands.”*

Participant's reflection on motherhood

## Overview

The trend to delay parenthood in developed countries is now so firmly established it has been coined the ‘postponement transition’ (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012). The age at which women have their first baby has not only increased on average over recent decades, but has also become more diverse (Weston, Soriano, & Qu, 2006). In 2011, 43% of first-time mothers in Australia were aged over 30 compared with 23% in 1991 (Australian Institute of Family Studies, 2014). In the same year, approximately one-third of women aged 35 to 49 gave birth to their first child (Li, Zeki, Hilder, & Sullivan, 2013). Similar trends have been reported in the United States and the United Kingdom, where in the past decade the rate of first births increased for women aged 35 and over but decreased for younger age groups (Office of National Statistics, 2012; U.S. Census Bureau, 2012).

Several factors are implicated in this trend, with higher levels of education and a focus on career frequently cited as primary determinants (Schmidt, et al., 2012). However, changing social trends, advances in contraception, delayed formation of a stable partner relationship, and the desire for financial security and emotional readiness before parenthood have also been identified as probable causes, and a complex interplay of factors is likely (Benzies et al., 2006; Cooke, Mills, & Lavender, 2012; Daly, 2011; Hand, 2001; Weston, et al., 2006). Recent qualitative studies have noted that for many women, delaying parenthood was not a conscious choice but rather a consequence of factors which were outside of their control such as relationship and fertility issues (Benzies, et al., 2006; Cooke, et al., 2012; Mac Dougall, Beyene, & Nachtigall, 2012). Advances in and increased access to fertility treatment have made it possible for couples with fertility problems to become parents, possibly after a long period of

unsuccessful conception, but such treatment is also being used to compensate for age-related fertility decline (Berryman, Thorpe, & Windridge, 1995; Schmidt, et al., 2012). Some commentators have questioned whether the availability of fertility technology falsely lulls women into delaying parenthood and perhaps contributes to infertility in women who have waited too long (Daly & Bewley, 2013).

Irrespective of the reasons for delayed parenthood, due to age-related fertility decline from around age 35, older women are more likely to require assisted reproductive technologies (ART) to conceive and some older women, especially after age 40, may need to use donated eggs or embryos to achieve a pregnancy (Collins & Crosignani, 2005; Gleicher, Weghofer, & Barad, 2007). Pregnancy at older ages is associated with increased medical risks. Associations between older maternal age and obstetric complications such as miscarriage, hypertension, placenta praevia, premature labour, caesarean birth, low infant birth-weight, and perinatal death are well-established (Carolan, 2013; Carolan & Frankowska, 2011; Cohen, 2014; Ludford, Scheil, Tucker, & Grivell, 2012; Vaughan, Cleary, & Murphy, 2014; Wong-Taylor et al., 2012).

These biological risks have contributed to representations of older mothers as “difficult”, “anxious”, “selfish”, “irresponsible”, and a proliferation of media reports and public health campaigns urging women not to leave motherhood too late (Berryman, et al., 1995; Carolan, 2005; Shaw & Giles, 2009). Anecdotal evidence has suggested that older mothers may have a greater risk of postnatal depression and maternal maladjustment (Carolan, 2005). There is also a widespread view that older parents may lack parenting capacity due to compromised physical capabilities and limited stamina to meet the demands of caregiving (Bornstein & Putnick, 2007) and the shorter life expectancy of older people (Pennings, 2013). Many of these speculations are fuelled by the recent and still controversial phenomenon of postmenopausal women



over the age of 50 using egg or embryo donation to achieve a pregnancy (Berryman, et al., 1995; Campbell, 2011). Offsetting these views, however, are the perceived advantages of delayed parenthood, including higher education and socio-economic status, family stability, and psychological resources which may positively contribute to adaptation to parenthood and parenting ability (Bornstein & Putnick, 2007; Harker & Thorpe, 1992; Mac Dougall, et al., 2012; Schmidt, et al., 2012).

Despite much speculation and anecdote with considerable coverage in the popular press, empirical evidence regarding adaptation to parenthood for older first-time mothers is limited and equivocal. Findings are difficult to reconcile due to differences in how studies define an ‘older’ mother and other methodological inconsistencies including different study designs (retrospective, prospective), analyses using age group comparisons vs. continuous age associations, the use of standardized and unstandardized measures to investigate seemingly similar outcomes, and failure to account for possible confounding variables. For example, the critical threshold for older age seems to vary with the year of publication, from age 30 (Gottesman, 1992; Mercer, 1986) to age 35 (Berryman & Windridge, 1996; Carolan, 2005) and more recently age 38 (Boivin et al., 2009; McMahon, Gibson, Allen, & Saunders, 2007) and 40 (Mac Dougall, et al., 2012; Sutcliffe, Barnes, Belsky, Gardiner, & Melhuish, 2012; Vaughan, et al., 2014). Few studies of parenthood at older ages have adequately taken account of ways in which socioeconomic characteristics and contextual factors, particularly conception using ART and maternal health, might confound results. While a major contribution has been made by qualitative research, empirical verification in larger samples of observations derived from interviewing small numbers of women is also needed.

A small number of empirical studies that control for the effects of potentially confounding variables suggest that older parenthood may confer some benefit in terms of the quality of parental interactive behaviour (Bornstein & Putnick, 2007; Bornstein, Putnick, Suwalsky, & Gini, 2006; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982), less parent-child conflict in preschool-aged children (Barnes, Gardiner, Sutcliffe, & Melhuish, 2013), more optimal child health and development at age five (Sutcliffe, et al., 2012) and child educational and psychosocial outcomes at age 18 (Fergusson & Woodward, 1999). The latter researchers note that more focus is needed on psychological correlates of older maternal age and the intervening processes linking maternal age and outcomes (Fergusson & Woodward, 1999). Others suggest that psychological maturity associated with increasing age may explain the parenting benefits of older maternal age (Bornstein, et al., 2006; Ragozin, et al., 1982).

Qualitative studies exploring the lived experience of mothers aged over 35 consistently report that older women identify attributes such as emotional preparedness, maturity, patience, self-awareness, and resilience as perceived advantages of delayed parenthood, with these characteristics believed to contribute to adaptation and satisfaction with motherhood as well as to parenting ability (Carolan, 2005; Dion, 1995; Mac Dougall, et al., 2012). Together these findings suggest that older motherhood is associated with greater psychological maturity, and the current research seeks to make a unique contribution by empirically examining this proposition.

The overarching aim of this thesis is to systematically examine firstly, whether older mothers are more psychologically mature and secondly, whether age-related maturity is adaptive during the transition to first-time motherhood. The impact of other contextual characteristics relevant to motherhood at older ages, such as conception using ART, maternal health, and higher levels of education, will also be considered.

The present research is not concerned with motherhood at ‘very advanced’ maternal age, often defined as older than 45 years (Carolan, 2013), nor were women conceiving with donated eggs or embryos a particular focus. Although the medical risks of childbearing at older ages is acknowledged, this research was concerned with the experiences of a cohort of first-time mothers aged across the spectrum of childbearing-age (Bornstein, et al., 2006), with women aged 37 or older, the age at which fertility decline accelerates (Gleicher, et al., 2007), and women who conceived with medical assistance oversampled relative to prevalence in the childbearing population of Australia. Participants were volunteers recruited during pregnancy, with adolescent women excluded due to the unique risk factors associated with teen childbearing which may potentially confound interpretation of findings. Participants ranged in age from 24 to 43 years, and age was examined as a continuous variable in all analyses. Information regarding recruitment of participants and study design are detailed in Chapter 2. The research sought to examine the psychological correlates of age and explore whether these characteristics provide any benefits for women when they do embark on parenthood at older ages.

This research was nested in a larger prospective study, Parental Age and Transition to Parenthood Australia (PATPA). The objectives of the PATPA study were to examine adjustment (psychological, social, and health) in pregnancy and early parenthood in older first-time mothers whilst taking into account mode of conception and other relevant contextual factors. Using a subsample of participants from the PATPA study, the current research involved an in-depth examination of psychological maturity and its relationships with maternal age and adaptation during the transition to parenthood. The aim was to supplement findings from the larger PATPA study by operationalising psychological maturity in a broad and novel way, exploring the

contribution made by contextual factors associated with first-time parenthood at older maternal age such as tertiary education, health, and assisted conception, and by assessing parenting in infancy using observational measures. Psychological maturity was conceptualised using characteristics thought to be important for positive adjustment to parenthood, namely capacities for emotion regulation, flexibility, adaptability, and perspective taking, using three different measures, ego resiliency, hardiness, and ego development (discussed in depth in Chapter 2).

Three studies were undertaken to address the study aims. These studies are presented in subsequent chapters in the form of papers submitted for publication. The first study explores whether maternal age is associated with greater psychological maturity using a latent factor of maturity with three indicators, hardiness (Kobasa, Maddi, & Kahn, 1982), ego resiliency (Block & Block, 1980), and ego development (Loevinger, 1976). This paper also examines the relationships among maternal age, psychological maturity, pregnancy adaptation (fetal attachment and maternal identity formation), and psychosocial adjustment in the early postnatal months (see Chapter 3).

Using the same latent factor of psychological maturity, the second study investigates whether age-related maturity is protective for maternal mental health (symptoms of anxiety, depression, and emotional health) in pregnancy and early parenthood in concert with a range of contextual variables that are associated with postnatal mental health and which may be different for older mothers, specifically relationship quality, health, and infant temperament (see Chapter 4).

The final paper involves a smaller subsample of mothers who participated in an additional observational study of parenting. To ensure that women were at least six months postpartum, by which time most women have adapted to the parenting role (Carolan, 2005), the quality of maternal interactive behaviour was assessed when

infants were aged about 7-months. Relationships among maternal age and parenting behaviour assessed using the constructs of sensitivity (Ainsworth, Blehar, Waters, & Wall, 1978) and mind-mindedness (Meins, 2013) were examined. This study explores whether age effects are attributable to psychological factors, specifically to hardiness and parenting control cognitions (see Chapter 5).

All three studies consider the effect of tertiary education as a possible confound (as well as other factors relevant to the specific outcomes examined in each paper), and the relationships established in the models tested are examined to ascertain whether they apply for women conceiving spontaneously as well as for women conceiving with medical assistance.

The next chapter will outline the theoretical framework of the study, discuss the aspects of adaptation during the transition to parenthood which are the focus of the research papers, critically review previous empirical findings regarding maternal age in relation to these outcomes, and outline contextual factors such as assisted conception and perinatal risk factors that may be relevant for women who delay parenthood and which may impact adaptation. The chapter then explores the construct of psychological maturity and how it was conceptualised in the current research before providing details of study design and participants.

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## Chapter 2: Background

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### **Theoretical Background**

Two theoretical frameworks inform the current study. The first addresses developmental changes across the lifespan as a function of either chronological age or social role transitions. The second focuses on the importance of maternal psychological characteristics for parenting. This chapter begins with a brief introduction to these theories and their relevance to the transition to parenthood for older first-time mothers.

### **Life Span Development**

A number of theories of development across the life span have been proposed (e.g., Baltes, 1997; Elder, 1975; Erikson, 1968; Levinson, Darrow, Klein, Levinson, & McKee, 1978; Vaillant, 1977). Erikson is credited as the first to propose that psychosocial development continues beyond adolescence and throughout adulthood and that development is in part driven by a response to socially determined age-related expectations, which has guided other theorists of adult development (Roberts & Newton, 1987). Many life span theories are based on the experiences of particular cohorts of middle class, white men. Although Levinson (1996) replicated his developmental framework on a cohort of women, a comprehensive life span theory of women's development does not yet exist (Bornstein, Putnick, Suwalsky, & Gini, 2006; Garrison, Blalock, Zarski, & Merritt, 1997). Nevertheless, life span theories, in which age is a basic element in the structure of the life course (Elder, 1975) generally view adult development in one of two ways.

One perspective views development as a series of stages or developmental tasks undertaken at a particular age or a pattern of development that is a consequence of chronological age (Roberts & Newton, 1987). Maturation or change is dependent on the outcome of each stage or task (Reinke, Holmes, & Harris, 1985). For example, in

Erikson's (1968) stage theory of psychosocial development, and in Levinson's (1978, 1996) seasons of adulthood, the period of early adulthood, roughly between late adolescence and age 30, is seen as the time when a person needs to achieve an identity, settle into a career, and form an intimate committed relationship in preparation for becoming a parent. Erikson (1968) proposed that successful mastery of the developmental challenge of 'generativity' in middle adulthood involved leaving a meaningful legacy or making a lasting contribution to the next generation, most commonly achieved through parenthood. According to his theory, success in generativity was based on resolution of the preceding stage task of 'intimacy', defined as the capacity to engage in an intimate personal relationship without compromising individual identity. Also working from a psychodynamic tradition, Deutsch (1945) and Benedek (1959), while not proposing lifespan theories of development, viewed motherhood as a necessary stage of development for women that enabled new levels of maturity to be reached (Osofsky & Osofsky, 1983).

Frameworks such as these suggest that not accomplishing the requisite life tasks at the appropriate period in the life span will hinder development, with unresolved conflicts making it more difficult to achieve the tasks of the next stage. By extension, women who delay parenthood may encounter more difficulties in adapting by not having completed the milestone of motherhood at the right time. This view may be endorsed by medical professionals given biological age-related declining fertility and the greater likelihood of medically-assisted conception and obstetric complications for older women.

An alternate view based on life-course theory (Elder, 1975) suggests development is based on social roles (e.g., family, education, employment) that are determined by the historical period rather than age per se, so that over time the life

course may change depending on the particular cohort (Helson, Mitchell, & Moane, 1984). According to this view, the contribution of age is best understood in terms of timing in relation to socially prescribed normative ages for certain life events, so called 'social clocks', but events are independent so that a person may be 'on-time' for certain life events and 'off-time' for others (Neugarten, Moore, & Lowe, 1965; Rossi, 1980). This theory emphasises the sociological context of development wherein development occurs smoothly if the expected and socially endorsed life course is not interrupted (Reinke, et al., 1985).

From this perspective, motherhood is influenced by social age deadlines, social ideas about the ages which are 'too early' or 'too late' to engage in childbearing, which are influenced by the cultural context (Billari et al., 2011). If the age at which a woman becomes a mother diverges from the age at which it is anticipated childbearing should occur, this 'off-time' transition may be associated with more negative outcomes (Elder, 1998). Childless women in their 30s and women embarking on motherhood at older ages are likely to look to their peers to gauge whether they are on-time or off-time and, given the shift over recent decades towards older first-time childbearing, discover a number of peers who are either similarly childless or just becoming mothers and thus feel less concerned or 'out of sync' than in previous cohorts (Benzies et al., 2006; Daly, 2011). Billari et al. (2011) suggest that the appropriateness of late childbearing for women is positively and significantly correlated with the actual rate of late fertility.

Historical time also influences the normative ages of life events across the life course, with age losing its customary social meanings as the life cycle becomes more fluid (Neugarten, 1979). The advent of contraception and advances in fertility treatment have meant that women are better able to regulate their fertility than in previous generations with these developments also influencing the social deadlines for



childbearing (Billari, et al., 2011; Daly, 2011). Recently, Arnett (2000, 2007) proposed the notion of ‘emerging adulthood’ in industrialised societies, a new life stage between adolescence and adulthood wherein increasing numbers of young people undertake tertiary education, remain at home with their parents, and delay financial independence and the establishment of committed relationships, suggesting that the tasks traditionally associated with entry into adulthood are accomplished at a later age than previously. Coupled with career and financial uncertainty and rising housing costs, the milestones still considered desirable before commencing a family are likely to be achieved less easily and later in the life course than in previous generations (Daly, 2011).

Daly and Bewley (2013) suggest that these historical influences have contributed to a conflict between biological and social clocks whereby women are no longer primarily concerned with a normative biological age for having children, but focus instead on a psychological readiness for children. Achieving the milestones of adulthood is an important part of the process of attaining psychological readiness for parenthood (Benzies, et al., 2006; Dion, 1995; Shelton & Johnson, 2006), making it less likely that women will feel prepared for children at a younger age. This suggests that women who have their first-child at an older age may be more psychologically prepared as well as more established in other life domains such as education, career, relationship, and financially (Goldberg, 1988). Consequently, this accumulation of experience and knowledge may contribute to older mothers being more psychologically mature, and this may have a positive impact on parental adaptation and child development as suggested by theoretical models of parenting (Belsky, 1984; Heinicke, 1984).

### **Theoretical Models of the Determinants of Parenting**

The conceptual models of parenting proposed by Belsky (1984) and Heinicke (1984) broadly suggest that parental psychological characteristics shape parenting

behaviour and hence child development. Belsky's (1984) process model of the determinants of parenting proposes that parenting is multiply determined by three general sources of influence: the parent's personality or personal psychological resources; characteristics of the child; and contextual sources of stress and support such as marital relations, occupational experience, and social network. Belsky suggests that each of these sources influence childrearing and, through the quality of parenting, child development. He argues that parental psychological resources are the most important as they not only directly affect parental functioning but are likely to be instrumental in determining the quality of contextual support both in terms of selection and also maintenance of relationships with spouse and friends. He further proposes that parents need sufficient psychological maturity to be able to take the perspective of others, control impulses, feel secure, and find ways of having their needs met in order to provide care for their infants that is child focused, responsive and sensitive.

Heinicke's (1984) framework similarly focuses on the pre-birth psychological characteristics of parents in combination with marital functioning and family supports as determinants of responsive parenting. He proposes that three aspects of parental personality are important for parenting: adaptation competence, which he defines as the ability to efficiently, calmly, persistently, and flexibly approach problem solving; a capacity for positive sustained relationships evidenced by empathy and mutuality in an ongoing relationship; and self-development involving self-confidence and a sense of autonomy. These characteristics are thought to be relatively stable so that parents who cope well with life issues before the birth of a child are likely to competently handle the demands of parenting. This proposal was empirically supported by results from a prospective study that showed pre-birth adaptation competence predicted maternal

responsiveness throughout the first year of parenthood (Heinicke, Diskin, Ramsey-Klee, & Given, 1983).

These models suggest that personality is important for parenting and that a psychologically mature individual is likely to parent in a way that is more supportive, sensitive, responsive, and stimulating. A body of research findings consistent with the major tenets of both parenting models have been reported in reviews (Belsky & Barends, 2002; Belsky & Jaffee, 2006; Heinicke, 2002). While mature personality characteristics have been shown to contribute to parenting behaviours, only a few studies have explicitly considered whether psychological maturity is also important for adjustment during the transition to parenthood (Grossman, Eichler, & Winickoff, 1980; Mercer, 1986; Shereshefsky & Yarrow, 1973). Previous conceptualisations of psychological maturity and its link with adaptation to parenthood and parenting will be discussed in more detail later in this chapter.

### **Age and Psychological Maturity**

Chronological age itself is not believed to be the cause of psychological development, rather age may be correlated with underlying processes of change or related to experiences that contribute to developmental change so that as people age they become more psychologically mature (Garrison, et al., 1997; Hendry & Kloep, 2007; Roberts, Robins, Trzesniewski, & Caspi, 2004). Nevertheless, age is often considered a marker or proxy for psychological maturity (Belsky, 1984; Belsky, Hancox, Sligo, & Poulton, 2012).

A number of researchers have suggested that it is personal maturity, indexed by chronological age, that predicts adaptation in pregnancy and early motherhood (Gottesman, 1992; Stark, 1997) but research supporting this contention is unsystematic and incomplete (Harker & Thorpe, 1992). Similarly, older mothers are believed to

possess psychological attributes as a result of their age that may enhance parenting abilities (Bornstein, et al., 2006; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982), but few studies have examined whether a parent's age is related to psychological maturity when evaluating the effect of either age or psychological resources on parenting (Belsky & Barends, 2002).

The aim of the current study is to systematically examine the relationships among age, psychological maturity, and adaptation during the transition parenthood including parenting at 7-months postpartum, while also accounting for the effects of contextual variables which may be particularly relevant for older first-time mothers. The following section will outline the aspects of adjustment to parenthood examined in the three research papers comprising this thesis and critically review empirical research to date regarding how older mothers adapt.

### **Adaptation During the Transition to Parenthood**

The transition to parenthood, the period from the beginning of pregnancy to the end of the infant's first year of life, is recognised as a significant developmental phase requiring physical, psychological, and social adaptation during which a woman integrates the role of mother into her sense of self and forms a relationship with her infant (Emmanuel, Creedy, St John, Gamble, & Brown, 2008). A woman's prior experiences, personality, and other contextual factors interact to influence how she responds during this period of major life change (Goldberg, 1988).

While this transition is obviously complex and multidimensional, three key aspects of adaptation will be independently examined in the current research: psychological adaptation to pregnancy and parenthood, including adaptation to the maternal role and the development of a relationship with the infant in pregnancy; maternal mental health (symptoms of depression, anxiety, and emotional health) in

pregnancy and postnatally; and parenting behaviour when infants are aged 7-months. The importance of these aspects of adaptation will be discussed in the following sections.

### **Psychosocial Adjustment in Pregnancy and the Early Postnatal Months**

Pregnancy not only involves physical transformation but also significant psychological challenges requiring a redefinition of self (Cohen & Slade, 2000). From early psychoanalytic perspectives (Benedek, 1959; Bibring, 1959; Deutch, 1945) to more recent psychological theories (Lederman, 1996; Leifer, 1980; Mercer, 1985; Rubin, 1984), pregnancy is recognised as an important developmental stage during which a woman alters her sense of self to take on a maternal identity. The process of maternal identity formation, which begins in pregnancy and continues after birth, has two key developmental tasks: forming clear and confident representations of the self as mother (Lederman, 1996; Mercer, 2004) and developing a relationship with the unborn child (Cranley, 1981; Leifer, 1980). Rubin (1984) proposed that a woman's binding in (attachment to the fetus) and the formation of a maternal identity are "interdependent co-ordinates of the same process" (p. 51). The clarity and confidence of maternal representations (both of self and baby) in pregnancy are believed to enable a woman to experience a more positive adjustment to motherhood, deal with the demands of mothering, and ultimately influence the quality of the mother-child relationship (Cohen & Slade, 2000; Rubin, 1984; Shereshefsky & Yarrow, 1973).

The early months following birth are characterised as a time of significant challenge and change involving interacting biological, psychological, and social levels of adaptation (Goldberg, 1988; Mercer, 1986; Rubin, 1984). While the first few months present major biological challenges such as recovering from birth, adapting to breastfeeding, and sleep disruption, the period of four to five months postpartum

represents a turning point (Carolan, 2005; Mercer, 1986). This period is characterised by a greater sense of achievement in the context of less fatigue, greater competence, more rewarding and pleasurable infant interactions, and more acceptance of normal feelings of ambivalence about the baby and associated life changes (Carolan, 2005). These observations reinforce the importance of considering both the positive and negative dimensions of the experience of motherhood at this time, while also considering that maternal adaptation involves not only adequate infant care, but other adaptations including sense of self as a mother, lifestyle, relationships, and emotional well-being (Astbury, 1994; Pridham & Chang, 1989).

The importance of successful negotiation of the developmental tasks of pregnancy for adjustment to motherhood has been confirmed in a number of longitudinal studies (Kiehl & White, 2003; Mothander, 1992). Attachment to the baby in pregnancy is not only related to self-care behaviours during pregnancy (Lindgren, 2001; Van den Bergh & Simons, 2009) but also to the quality of the observed mother-child relationship in infancy (Siddiqui & Hägglöf, 2000). Equally, maternal confidence and identification in pregnancy has been found to predict sense of competence, feelings of fulfilment and accomplishment, satisfaction, and confidence in coping as a mother (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988; Kiehl & White, 2003). Recent findings showed that more positive maternal representations of the parent-child relationship in pregnancy were predictive of lower parenting stress during the first year of parenting (Flykt et al., 2009).

Successful maternal adaptation is regarded as critical to the development of a healthy, flexible, and reciprocal mother-infant relationship (Cohen & Slade, 2000). Women who report better postpartum adjustment are generally more sensitive when interacting with their infants (Grossman, et al., 1980), with sensitivity, generally

defined as a capacity to accurately read child cues and respond in an appropriate manner (Ainsworth, Blehar, Waters, & Wall, 1978), a well-established predictor of secure parent child attachment (De Wolff & van Ijzendoorn, 1997). Conversely, mothers who experience more difficulty in adapting to parenthood are likely to have more negative attitudes towards care-giving and their babies, are at increased risk of maternal mental health problems such as anxiety and depression, and are likely to be less sensitive in interactions with their infants. In extreme cases this may result in compromised infant development (Emmanuel, et al., 2008).

### **Maternal Mental Health**

While psychosocial adaptation specific to maternal role acquisition is a key task during the transition to parenthood, the mental health of a woman during this transition is very important. Maternal mental health impacts a woman's adjustment to parenthood, the quality of the mother-infant relationship, and the health and development of her infant (Murray, Cooper, & Hipwell, 2003). The perinatal period is potentially the period in a woman's life where the risk of psychopathology is highest (O'Keane, 2006) due to physiological and psychological changes, the significant challenges of caring for a dependent infant, and occupational and social losses (Pope, Watts, Evans, McDonald, & Henderson, 2000). Although much research on perinatal mental health is concerned with identifying women with clinically significant depression and anxiety (and other psychopathology) using diagnostic criteria and subsequently administering appropriate clinical interventions, subclinical symptoms of stress, anxiety and depression can also have adverse consequences for a mother and her infant (Fisher, Feekery, & Rowe-Murray, 2002).

The transition to parenthood is regarded as a time of normative emotional challenge however, symptoms of anxiety and depression in pregnancy can impede the

psychological redefinition required for the formation of a maternal identity and development of a relationship with the unborn child (Hart & McMahon, 2006; Lindgren, 2001). Mood problems are associated with lower expectations of parenting self-efficacy (Wernand, Kunseler, Oosterman, Beekman, & Schuengel, 2014), which can have negative implications for maternal postnatal adjustment and infant care (Cohen & Slade, 2000). Psychological distress in pregnancy is also associated with poorer health practices (Lindgren, 2001) and increased risk of obstetric and neonatal complications such as preterm delivery, low birth weight, and caesarean birth (Austin & Leader, 2000; Hedegaard, Henriksen, Sabroe, & Secher, 1993). Mental health symptoms in pregnancy are also the most robust predictor of postnatal depression and anxiety disorders (Milgrom et al., 2008; Schmied et al., 2013).

Following birth, distressed mood is associated with less gratification with mothering, premature cessation of breastfeeding (Murray, et al., 2003), difficult infant temperament (Davis et al., 2004; McMahon, Barnett, Kowalenko, Tennant, & Don, 2001), and admission to residential facilities for support with early parenting difficulties (Fisher, et al., 2002; Fisher, Hammarberg, & Baker, 2005). Maternal depression and anxiety, even in non-clinical samples, have been linked to less optimal parenting behaviours including less warmth and sensitivity, more negative affect, and less positive interactions with infants (Belsky & Jaffee, 2006; Field, Diego, & Hernandez-Reif, 2009; Flykt, Kanninen, Sinkkonen, & Punamäki, 2010; Nicol-Harper, Harvey, & Stein, 2007). This may be due to a distressed mother's preoccupation with negative emotions that compromises her ability to focus on and interpret infant cues and appropriately respond, resulting in disengagement and withdrawal or intrusiveness and/or hostility (Field, et al., 2009; Murray, et al., 2003). Insensitive maternal



responses may consequently compromise the developing attachment relationship between mother and child.

A growing body of literature shows maternal perinatal psychological health predicts child emotional and behavioral functioning years later (e.g., Anhalt, Telzrow, & Brown, 2007; Zimmer-Gembeck & Thomas, 2010). Studies have linked maternal mental health symptoms in pregnancy with neonatal behaviour suggestive of less attention and more arousal (Field, et al., 2009), greater infant reactivity (Davis, et al., 2004), emotional and behavioural problems in early childhood (O'Connor, Heron, Golding, Beveridge, & Glover, 2002), and child attention problems (Clavarino et al., 2010) even after controlling for postnatal symptomatology. These results lend support to the fetal programming hypothesis whereby exposure to maternal stress hormones in utero impacts the developing regulatory system of the fetus (Huizink, Mulder, & Buitelaar, 2004; O'Connor, Heron, Golding, Glover, & the ALSPAC Study Team, 2003). Whether through biological mechanisms or via parenting interactions, or, most likely both, poorer maternal mental health appears to be a risk for infant development.

### **Parenting in Infancy**

The preceding account identifies that early parenting plays an important role in child development. The quality of parenting in infancy is typically evaluated by examining how a mother interacts with her infant, with sensitive attunement to infant signals, a prompt and appropriate response, support for child autonomy, emotional warmth, and acceptance widely recognised as key features of optimal parenting (Clark, Kochanska, & Ready, 2000). The importance of sensitive parenting was most notably advanced by Bowlby in his influential theory of attachment (Bowlby, 1969/1982), which proposed that the interaction between a mother and child in infancy is a

significant determinant of the quality of their attachment relationship and the developing child's psychosocial wellbeing (Sroufe, 2005).

According to Bowlby's theory of attachment (1969/1982), an infant is biologically primed to engage a caregiver using behaviours such as crying, smiling, approaching, and following in order to elicit care, comfort, and protection, with the primary aim of this behavioural system to maintain proximity to the caregiver. The behavioural system is complemented by a reciprocal caregiving system in the parent who is similarly biologically adapted to read infant signals, respond and keep infants safe (George & Solomon, 1996). A mother's consistent prompt, reliable, and appropriate responsiveness towards her infant contributes to the infant forming an internal representation or inner working model of the caregiver as trustworthy and available and this in turn provides the infant with a sense of control and of self-worth. Through repeated interactions with the caregiver an infant learns to recognise and manage his/her emotions and behaviour. If a secure attachment is formed, the infant is able to utilise the attachment figure as a support for exploration, a 'secure base' from which the infant can engage with and learn about the physical and social environment confident that the attachment figure will assist if the need arises (Bowlby, 1969/1982; McElwain & Booth-LaForce, 2006).

### **Sensitivity**

One of the earliest constructs of parenting quality grounded in Bowlby's theory of attachment was that of maternal sensitivity, first conceptualised empirically by Ainsworth and colleagues (Ainsworth, et al., 1978). The optimally sensitive mother was described as one who is alert to perceive her baby's signals, able to interpret these signals accurately, and able to respond promptly and appropriately. Ainsworth et al.' (1978) sensitivity measure was developed after extensive home observations of mothers

and infants during the first year of life. This process also enabled identification of individual differences in patterns of attachment (categories described as secure, insecure-avoidant, insecure-ambivalent) and the development of a laboratory method of assessing these individual differences, the Strange Situation. The current study did not evaluate the attachment classifications of mother-infant dyads as this cannot be assessed reliably until infants are approximately a year old, but instead examined the quality of the relationship between mother and infant using the construct of sensitivity.

While maternal sensitivity has been found to be a significant contributor to the development of secure attachment, sensitivity also predicts many other aspects of socio-emotional and cognitive development during infancy and childhood, including social competence, behavioural independence, verbal ability, and intellectual achievement (Bernier, Jarry-Boileau, Tarabulsky, & Miljkovitch, 2010; Bornstein, 2002; Bornstein, Hendricks, Haynes, & Painter, 2007; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; De Wolff & van Ijzendoorn, 1997; Sroufe, 2005).

Sensitivity is considered an affective and behavioural quality of the dyadic interaction between mother and infant, rather than solely a maternal characteristic (Nicholls & Kirkland, 1996; van den Boom, 1997). Nevertheless, individual differences in maternal sensitivity have been found to be influenced by a host of parental variables including personal attachment history, belief systems, culture, ecological considerations such as marital relationship, work environment, and social support, socio-demographic factors such as education, as well as child characteristics (Bornstein, Hendricks, et al., 2007; Thompson, 1997). Parenting at a younger age, particularly in adolescence, has consistently been associated with less sensitive parenting (Berlin, Brady-Smith, & Brooks-Gunn, 2002; Broom, 1994; McFadden &

Tamis-Lemonda, 2013), however the impact of ‘older’ maternal age has not been as extensively examined (Bornstein, et al., 2006).

Following Ainsworth’s seminal work, developmental researchers have extended and often redefined her formative conceptualisation of sensitivity and the 9-point global sensitivity scale she designed to assess individual differences in interactive behaviour. A number of observational instruments to assess maternal sensitivity now exist, many of which are used in shorter, laboratory based tasks (Mesman & Emmen, 2013). The widely used National Institute of Child Health and Human Development (NICHD) qualitative rating scales (NICHD Early Child Care Research Network, 1999; Owen, 1992) were used to assess maternal sensitivity in the parenting study presented in Chapter 5. These scales are based on Ainsworth’s work and an attachment framework, involve a global assessment of sensitivity, and are designed to be used in infancy in a brief semi-structured free play setting (Mesman & Emmen, 2013).

The ability of a mother to respond in a sensitive manner to infant signals is believed to be influenced by her ability to mentalize, a capacity to ascribe thoughts, feelings, ideas, and intentions to others (Sharp & Fonagy, 2008). A recent construct, mind-mindedness (Meins, 1997), developed from Ainsworth’s sensitivity framework, operationalises the quality of caregiver-infant interaction in the first year of life as a mother’s ability and proclivity to treat her child as an individual with a mind enabling her to tune into what the infant may be thinking or feeling. This construct is believed to be a pre-requisite for sensitivity (Laranjo, Bernier, & Meins, 2008) and at the interface between behavioural and representational measures of the quality of the mother-infant relationship (Meins, 2013).

### **Mind-mindedness**

Meins and colleagues suggest that it is necessary to consider a mother's use of mind-related language, in addition to caregiver behaviour, to assess sensitive responding (Meins, Fernyhough, Arnott, Turner, & Leekam, 2011). Assessment of mind-mindedness in infancy involves an analysis of the mother's language during play with her infant, in particular the extent to which she comments on her infant's likely thoughts and feelings, or speaks on behalf of her child (Meins, 2013). In older children, mind-mindedness is assessed from a mother's use of mental characteristics to describe her child when given an open-ended invitation to do so (Meins, Fernyhough, Russell, & Clark-Carter, 1998). Meins (2013) suggests that mind-related comments overtly tap a mother's attributions about her infant's internal mental state. By voicing out loud what might be going on in her child's mind, the mother provides the most obvious indication of her representations of her infant's thoughts or feelings, with this attunement to internal states facilitating secure attachment.

Mind-mindedness has been explored as a key component of maternal sensitivity, although the two constructs are distinct. A number of studies have found associations between the two (Meins et al., 2012; Meins, Fernyhough, Fradley, & Tuckey, 2001; Rosenblum, McDonough, Sameroff, & Muzik, 2008), although some have not (Demers, Bernier, Tarabulsky, & Provost, 2010a; McMahon & Meins, 2012), while another found that mind-mindedness mediates the relationship between sensitivity and attachment security (Laranjo, et al., 2008). Meins (2013) suggests that global ratings of sensitivity and appropriate mind-minded comments tap into similar aspects of sensitive responsiveness but are by no means equivalent. Mind-mindedness has been shown to predict a number of child development outcomes independently of sensitivity including attachment security (Laranjo, et al., 2008; Meins, et al., 2012; Meins, et al., 2001),

theory of mind development in early childhood (Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013), and children's emotional and behavioural development in lower socio-economic status families (Meins, Centifanti, Fernyhough, & Fishburn, 2013).

Recently Meins and colleagues have proposed that mind-mindedness is a stable predisposition specific to close personal relationships (Meins, Fernyhough, & Harris-Waller, 2014) and empirical findings confirm mind-mindedness is generally not influenced by socio-economic context, maternal psychological well-being or child characteristics (McMahon & Meins, 2012; Meins, et al., 2011; Rosenblum, et al., 2008). The few studies that have considered the relations between maternal age and mind-mindedness have found that older mothers are more mind-minded when interacting with infants and young children (Demers, Bernier, Tarabulsy, & Provost, 2010b; Meins, Centifanti, et al., 2013).

The quality of the interaction between a mother and infant, assessed in various ways, is clearly important for the future development of the child. One factor which may influence this interaction, and which may be associated with maternal age and psychological maturity, are beliefs/cognitions a mother holds about parenting.

### **Parenting Cognitions**

Cognitions are an important determinant of parenting and are thought to have many purposes including generating, organising, and shaping parental behaviours and mediating the effectiveness of parenting (Bornstein et al., 2007). Parents who are able to reflect on and understand the probable effects of their parenting behaviours and who consider themselves competent and effective are more likely to act as constructive partners in their children's development (Bornstein, Hahn, & Haynes, 2011). Cognitions are linked to affective and behavioural aspects of parenting and can be altered as a result of experience within the parenting role (Bugental & Johnston, 2000).

While the content of parenting cognitions is obviously diverse, a large body of research from a social-cognitive tradition has been devoted to parents' sense of efficacy in the parenting role. Findings generally show that parental self-efficacy is a predictor of parental competence and impacts child adjustment directly but also indirectly via parenting practices and behaviours (for a review see Jones & Prinz, 2005). Based on the social learning concept of self-efficacy (Bandura, 1977), parental self-efficacy reflect a person's beliefs about their capabilities to meet the demands of parenting. Socioeconomic disadvantage and other contextual characteristics, such as younger parental age, may undermine or limit the development of parental self-efficacy (Jones & Prinz, 2005).

The construct of locus of control (Rotter, 1966) is similar to self-efficacy, focusing on the degree to which a person believes an outcome is contingent on their own behaviour (internal) or a function of fate, chance or factors outside their control (external). Parents with a more external locus of control have low parental self-efficacy, a sense that they are dominated by child demands, and believe they have little impact on the parent-child relationship and child development and behaviour (Campis, Lyman, & Prentice-Dunn, 1986). Although this construct has not been investigated as comprehensively as parental self-efficacy, associations between a parent's beliefs regarding their ability to influence their child and the environment in ways that can foster the child's development and sensitive and responsive parenting have been reported (Bornstein et al., 2003; Bornstein, Hendricks, et al., 2007; Donovan, Taylor, & Leavitt, 2007; Teti & Gelfand, 1991). An external locus of control, on the other hand, has been associated with more authoritarian parenting (Bugental & Johnston, 2000; Janssens, 1994).

Researchers have suggested parental locus of control may result from mother-infant interactions in infancy or may arise from parental personality, although a combination of both parent and child characteristics is likely (Hagekull, Bohlin, & Hammarberg, 2001). One study reported associations between parental locus of control and a number of socio-demographic factors such as age, education, income and marital status however, contrary to expectations, older maternal age was associated with lower feelings of parenting control, while education contributed to greater parenting efficacy (Freed & Tompson, 2011). These studies raise questions regarding the contributions of both maternal age and psychological characteristics to parenting cognitions and parenting behaviour, which were addressed in the parenting study presented in Chapter 5.

In summary, adaptation to parenthood is complex and involves a number of interrelated domains. The current research focuses on several key aspects, considered independently in separate studies, specifically psychosocial adaptation in pregnancy and the early months of motherhood, maternal mental health, and parenting cognitions and mother-infant interaction when infants are aged 7-months. The next section critically reviews previous research regarding adaptation to motherhood for older women.

### **Empirical Findings Regarding Maternal Age and the Transition to Parenthood**

Many studies concerned with the impact of maternal age on adjustment to parenthood focus on childbearing at younger ages. In these studies, adolescent mothers are compared with 'older' adult mothers, with results typically confirming that parenting in adolescence is associated with less optimal outcomes for both mother and child (for a review see Moore & Brooks-Gunn, 2002). Conversely, studies with a specific focus on delayed motherhood generally compare groups of women dichotomised at a specific age defined as 'older' with those younger than this age.



Fewer studies explore the effects of maternal age across a continuous spectrum of age including older ages (Bornstein, et al., 2006).

Due to methodological inconsistencies, in particular differences in definitions of what constitutes an ‘older’ mother and analyses comprising either age group comparisons or age treated as continuous, it is difficult to synthesise results of studies concerned with childbearing at older ages. In addition, many studies have small sample sizes and some fail to control for possible confounding factors such as socio-demographic and contextual variables (e.g., education, parity, and assisted conception), which are likely to impact adjustment. Overall, although the literature is not extensive, findings are equivocal regarding adjustment for older first-time mothers. The following review focuses on results of studies relevant to the outcomes in pregnancy and the first-postnatal year addressed in the current research, and also discusses methodological limitations of particular studies that may impact the generalizability of those findings.

### **Adjustment in Pregnancy**

A small number of prospective studies have examined pregnancy adaptation for older women and many have reported positive adjustment. Controlling for parity and compared with younger women, women aged 35 or older have reported fewer somatic symptoms, more positive bodily perceptions, and comparable fetal attachment in the third trimester of pregnancy (Berryman & Windridge, 1996; Robinson, Garner, Gare, & Crawford, 1987; Windridge & Berryman, 1996). Women aged 35 or more did not differ from those aged 32 or less in terms of pregnancy wellbeing and identification with motherhood, although parity was not controlled in this study (Stark, 1997). In a study with a small sample (N=41) that used a semi-structured interview to create variables of adaptation in pregnancy, women 30 years and over reported a richer, more interactive relationship with their fetus and greater visualization of themselves as

mothers compared with pregnant women aged less than 30 (Gottesman, 1992). Conversely, women aged 38 and over endorsed less identification with motherhood in pregnancy but comparable fetal attachment when compared with women aged 35 or less in a sample of women who conceived with ART (McMahon, Gibson, Allen, & Saunders, 2007).

On the other hand, some studies have reported a negative relationship between increasing age and fetal attachment (Lindgren, 2001; Mercer, Ferketich, May, DeJoseph, & Sollid, 1988; Rees, 1980), although these studies were not concerned with older maternal age as a primary focus, parity and gestational age at time of assessment were not controlled, and in the study by Mercer et al. (1988) this association was found only in women with a high-risk pregnancy. Recent reviews indicate the relationship between maternal age and prenatal attachment remains unclear (Alhusen, 2008; Cannella, 2005; Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009). In a qualitative study of 22 first-time mothers aged 35 to 48, Carolan (2005) noted that many women reported a deliberate strategy of maternal distancing and lack of engagement with the fetus in pregnancy due to concerns regarding fetal vulnerability in older women. Similarly, the notion of a 'tentative' pregnancy (Rothman, 1986) has been described in previously infertile women who avoid assuming a maternal identity or forming a relationship with the fetus due to uncertainty about pregnancy outcome (McMahon, Tennant, Ungerer, & Saunders, 1999). It therefore appears that risk perceptions may impact maternal identity formation in pregnancy for both older women and those requiring medical assistance to conceive.

With regard to symptoms of mental health in pregnancy, studies suggest comparable or more optimal adjustment for older mothers. One study of women aged 35 and over reported fewer symptoms of anxiety and depression than younger women

(Robinson, et al., 1987), however socioeconomic differences between groups were not controlled. Berryman et al. (1995) reported that women aged 35 and over were not at increased risk of experiencing depressive symptoms in pregnancy, and similar results were reported by Clavarino and colleagues (Clavarino, et al., 2010) with respect to symptoms of anxiety in a large sample of women where parity was not controlled. In a sample of women conceiving with ART, women aged 38 or more reported comparable symptoms of anxiety and depression to women aged less than 35 years (McMahon, et al., 2007).

### **Postnatal Adjustment**

Generally positive adjustment to motherhood for older first-time mothers has been reported in a number of studies. Mercer (1986) reported comparable maternal role attainment between older mothers (aged 30 to 42) and those aged less than 30 after controlling for education, race and marital status, and although older mothers exhibited more observer-rated 'adaptive' maternal behaviours the difference was not statistically significant. Similarly, Roosa (1988) found no differences in self-esteem or locus of control between women aged 28 to 37 with those aged 19 to 27 at 3-, 6-, and 12-months postpartum although demographic differences were not controlled.

Some studies have reported associations between older maternal age (range 21-35 years) and positive parenting in infancy (Feldman & Nash, 1986; Grossman, et al., 1980) however these studies had relatively small samples and socio-demographic factors were not controlled. In studies where education and other demographic factors were controlled, Ragozin et al. (1982) similarly found that increased age (range 16-38 years) was associated with greater satisfaction with parenting and more optimal observed parenting behaviour at four months, while more recently Bornstein et al. (2006) reported an association between age and greater sensitivity and structuring in

interactions between first-time mothers aged 13 to 42 years and their five-month old infants. Interestingly, this latter association was non-linear, with age conferring a benefit up to the age of 30 but attenuating thereafter.

In contrast, evidence of less positive adjustment for older mothers has also been reported. Carolan (2005) noted that although women aged 35 or more did not experience difficulties adjusting to the maternal role, it appeared that they took longer to adapt. Similarly, in a prospective study with a small sample, Robinson et al. (1988) reported positive adjustment throughout the first year of parenthood for women aged over 35 but self-reported psychological and physical symptom severity (on a symptoms checklist) took longer to dissipate than in younger counterparts. Bornstein et al. (2006) found an association between maternal age and infant maladjustment during the first month postpartum, suggesting older mothers may perceive their infants as more difficult or have more difficulty coping with the normative challenges of newborn adjustment. Mercer (1986) reported that older mothers (aged 30 or more) found mothering less gratifying than younger mothers but noted that this finding may in part be due to the effects of tertiary education, which was also associated with less gratification with mothering. A recent Australian study with a large sample (Emmanuel, et al., 2008) suggested that older maternal age adversely affected maternal role development, however this interpretation was based on a negative association between age and a score for life change as a result of parenthood, the significance of which was not clearly explained.

Findings have also been mixed with regards to postnatal mental health. Studies have reported that older women (aged 35 or more) were less likely to experience anxiety (Clavarino, et al., 2010) and at comparable risk of postnatal depression when compared with younger counterparts (Carolan, 2005; Robinson, et al., 1988; Windridge

& Berryman, 1996, 1999). On the other hand, one Australian study reported increased odds of postnatal depression in first-time mothers aged over 34 in a large sample (Astbury, Brown, Lumley, & Small, 1994), while another reported that mothers aged 35 to 42 had high levels of perceived stress at one year postpartum (Reece, 1995). This latter finding is problematic in that mean level of stress was compared with scores reported in non-comparable samples in other studies and confounding variables which may account for stress at the time of assessment were not considered.

In summary, although positive adjustment has been reported in a number of studies, findings regarding adaptation to parenthood for ‘older’ mothers are equivocal. As previously noted, many of these studies have methodological limitations, predominantly small samples and failure to account for confounding variables especially socio-demographic differences (e.g., Feldman & Nash, 1986; Gottesman, 1992; Roosa, 1988; Stark, 1997). However, some studies matched participants in terms of parity, education, marital status, and occupation (Berryman & Windridge, 1996; Robinson, et al., 1988; Windridge & Berryman, 1996, 1999) while others controlled for socio-demographic factors in analyses (Bornstein, et al., 2006; Ragozin, et al., 1982).

Despite the generally held view that older mothers are likely to experience health complications during pregnancy and postnatally which might also affect the health of their infant (Berryman & Windridge, 1998; Carolan & Frankowska, 2011; Vaughan, Cleary, & Murphy, 2014), few studies considered whether maternal or infant health confounded findings. Exceptions in this regard were the study by Mercer (1986), who noted that women aged 30 and older were more likely to have experienced a caesarean birth, report poorer health, and greater fatigue at one month postpartum although this did not appear to impact overall adaptation to parenthood, and a study of the birth experiences of older women which revealed few age effects despite women

aged over 35 generally being considered ‘high-risk’ (Windridge & Berryman, 1999). Bornstein et al. (2006) also reported a lack of association between age and pregnancy complications but found a small, significant association between age and birthing complications although the latter was not related to parenting practices at five months.

A significant limitation in all these studies was that none considered whether assisted conception impacted adjustment. Given the association between increasing age and declining fertility, conceiving later in the reproductive life cycle is likely to require medical assistance (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012). The experience of assisted conception may also confound associations between maternal age and adaptation to parenthood. The next section will briefly review findings regarding the transition to parenthood for women who conceived using ART.

### **Assisted Reproduction and Adaptation to Parenthood**

A growing body of research exists in relation to the transition to parenthood for mothers conceiving with ART. Most studies, however, control for age in order to isolate the impact of assisted conception, thus obscuring age effects. The few studies that have considered age effects in ART samples are discussed at the end of this section. First, general findings regarding adaptation during the transition to parenthood are discussed.

A systematic review reported mixed findings when comparing maternal adjustment in women conceiving using ART and those conceiving spontaneously (Hammarberg, Fisher, & Wynter, 2008). In pregnancy, some studies have found no differences in identification with motherhood (Halman, Oakley, & Lederman, 1995; Stanton & Golombok, 1993), attachment to the fetus (Hjelmstedt, Widström, & Collins, 2006; McMahon, Ungerer, Beaurepaire, Tennant, & Saunders, 1997; Stanton & Golombok, 1993), or prenatal expectations of the baby and parenthood (Flykt, et al.,

2009). Others suggest the formation of a maternal identity in pregnancy is more complex in ART mothers who form a more intense and protective attachment to the fetus from earlier in the pregnancy (Fisher, Hammarberg, & Baker, 2008). On the other hand, mothers conceiving through ART may be tentative in preparing for their baby due to concerns about the risk status of their pregnancy (McMahon, et al., 1999).

Similarly, varied findings in respect to postnatal adjustment have been reported. Compared with spontaneously conceiving women, ART mothers were found to have lower maternal self-efficacy at four months postpartum (McMahon, Ungerer, Tennant, & Saunders, 1997), fewer adjustment problems at two months postpartum (Repokari et al., 2006), and no differences in terms of adaptation to motherhood (Halman, et al., 1995), parenting stress (Flykt, et al., 2009), nor in socio-emotional investment in the child at four months postpartum (Gameiro et al., 2011).

In relation to maternal mental health, two reviews conclude that women conceiving through ART are not at increased risk of adverse mental health either in pregnancy or postnatally (Hammarberg, et al., 2008; Ross, McQueen, Vigod, & Dennis, 2011). A series of studies has reported, however, that admission rates to Australian residential services for the treatment of distressed mood and early parenting difficulties are significantly higher in women conceiving with ART than their spontaneously conceiving counterparts (Fisher, et al., 2005; Fisher, Rowe, & Hammarberg, 2012; Hammarberg, Rowe, & Fisher, 2009). However ART mothers in these studies were older and also more likely to be first-time mothers, to have had a Caesarean birth, twins, and low birth-weight babies, and the authors acknowledge that these factors might have had a cumulative negative effect on adjustment to motherhood. They further suggest that mothers conceiving through ART may idealise pregnancy after a long struggle to

conceive and may therefore be vulnerable to disappointment and feelings of inadequacy when faced with the normal demands of early parenthood.

Despite these observations, no evidence of parenting problems in infancy or later childhood for women who conceived with ART has been found (Boivin et al., 2009; Golombok & MacCallum, 2003). In terms of parenting quality in infancy, observational studies have consistently found no differences between previously infertile and spontaneously conceiving mothers with regard to maternal sensitivity (Hammarberg, et al., 2008). However, some studies using self-report measures of parenting of older children have reported that assisted conception mothers were warmer and more emotionally involved with their children than spontaneously conceiving mothers (Golombok, 2002).

The few studies that have explicitly focused on age differences in samples of women conceiving with ART also report mixed findings. One study which examined age effects in pregnancy found that older women aged 38 and over reported less identification with motherhood, comparable maternal fetal attachment, and no differences in depression and anxiety symptoms when compared with younger women aged 35 or less (McMahon, et al., 2007). On the other hand, Repokari and colleagues (2005) reported that older mothers were more vulnerable to depression irrespective of mode of conception. In terms of outcomes when the child is older, Boivin and colleagues (Boivin, et al., 2009), in a study using retrospective and concurrent self-report measures in families of children aged four to 11 who had been conceived using ART, found no association between older maternal age and poorer child outcomes. Older mothers rated interactions with their child as more positive, however mothers aged over 38 also reported higher symptoms of depression than mothers aged 31 or younger.



Despite some divergent findings in relation to specific outcomes, overall it appears that women conceiving with ART adjust to parenthood in much the same manner as women conceiving without medical assistance, with equivocal age effects also apparent in the few studies that have examined the impact of maternal age.

Given equivocal age results and methodological limitations of previous studies, the current research seeks to further investigate age effects while accounting for the influence of potentially confounding factors related to motherhood at older ages, specifically assisted conception, tertiary education, and maternal and infant health. Additionally, a major focus of the current research is to examine the impact of psychological maturity on adaptation during the transition to parenthood. Studies that have considered maternal age, whether in women who conceived with ART or spontaneously, frequently ascribe positive outcomes for older mothers to the greater ‘maturity’ of women who delay parenthood. Few studies however, actually examine the relationships among age, ‘maturity’ variously conceptualised, and concrete outcomes during the transition to parenthood. The importance of psychological maturity during the transition to parenting is discussed in the following section.

### **Psychological Maturity and Adaptation to Parenthood**

The transition to parenthood, and parenting in general, are challenging, affectively charged experiences which can tax parental resources (Kochanska, Lee Clark, & Goldman, 1997; Prinzie, Stams, Dekovic, Reijntjes, & Belsky, 2009). Emotional distress during the transition to parenthood is thought to be related to inadequate psychological resources and a lack of maturity (Mirowsky & Ross, 2002; Osofsky & Osofsky, 1983). The models of parenting previously described (Belsky, 1984; Heinicke, 1984) suggest that parental resources are an important determinant of

parenting and the context in which parenting and child development occur, and are clearly also implicated in adaptation during pregnancy and early parenthood.

Maternal pre-birth psychological characteristics, such as ego strength and psychological integration, referred to as indicators of maturity, have been found to predict better postpartum adjustment and parenting in infancy (Grossman, et al., 1980; Heinicke, et al., 1983; Mercer, 1986; Shereshefsky & Yarrow, 1973). Similarly, a number of studies have confirmed the relationship between parental personality traits (measured using the five-factor model of personality) and parenting (for a review see Prinzie, et al., 2009), with a smaller body of research supporting a link between psychological maturity conceptualised in other ways (e.g., life adaptation, ego resiliency) and supportive, growth promoting parenting (for a review see Belsky & Barends, 2002).

A link between chronological age and maturity has been proposed in the parenting literature but empirical confirmation of this association is lacking. In examining maternal adaptation among different age groups, Mercer (1986) noted a disparity between the energy of youth and the perspective of maturity. The ‘maternal maturity hypothesis’ (Bornstein, et al., 2006; Hofferth, 1987) suggests that older mothers may benefit from more life experience, resources, and a greater psychological preparedness for motherhood that enables them to provide more responsive parenting than young mothers. In studies where older maternal age is associated with advantages in terms of parenting behaviours, researchers have speculated whether age effects are attributable to emotional maturity (Ragozin, et al., 1982), maturity of personality and cognitive functions (Bornstein, et al., 2006), or whether maturity confers an ability to cope effectively and creatively with annoyance or misbehaviour in young children (Barnes, Gardiner, Sutcliffe, & Melhuish, 2013).

Some studies have noted an association between age and psychological maturity but this has not been investigated systematically in relation to maternal adjustment in those studies. Mercer (1986) found that women aged 30 and above were more psychologically flexible and integrated on personality measures than women aged under 30, and these characteristics were thought to explain older mothers' greater adaptive competence in the first year of motherhood. Similarly, McMahon et al. (2007) found older pregnant women aged 38 or more scored higher on a measure of psychological hardiness than younger women, and speculated whether this was protective in managing the stresses related to age-related obstetric risk factors. In qualitative research, women aged 35 and older have reported a psychological readiness for motherhood related to personal growth and maturity, emotional stability, and a capacity for restraint and discipline (Berryman & Windridge, 1991; Carolan, 2005; Frankel & Wise, 1982; Kern, 1982; Mac Dougall, Beyene, & Nachtigall, 2012).

The primary aim of the current research is to examine whether age is associated with psychological maturity and to explore the relationships among age-related maturity and concrete prospective outcomes during the transition to parenthood as previously detailed. The next section discusses the construct of psychological maturity and how it was conceptualised in the present study.

### **Conceptualising Psychological Maturity**

Developmental psychology views maturity as movement towards a desirable developmental endpoint and a number of perspectives regarding what constitutes psychological maturity have been proposed (Roberts, et al., 2004). From a humanistic perspective, maturity involves self-actualization and personal growth (Maslow, 1954; Rogers, 1961). Another view, arising from Allport's (1961) definition of the mature person, characterises maturity as involving qualities that facilitate effective functioning

such as the capacity for warm and compassionate relationships, higher levels of emotional stability, and greater well-being (Helson & Wink, 1987; Roberts, et al., 2004). Hogan and Roberts (2004) proposed a socio-analytic model of maturity which fits with this functional view. They suggest maturity has both an ‘outside’ perspective, the impact one has on others, and an ‘inside’ perspective, how one feels about oneself, with each element involving personality traits such as agreeableness, conscientiousness and emotional stability.

More recently, two aspects of maturity have been delineated; social-emotional wellbeing, which deals with how good one feels about the self in the world of others, and social-cognitive maturity, the complexity with which one thinks about the self and others (Bauer & McAdams, 2004, 2010; King, 2001; King & Hicks, 2006, 2007). These aspects together are regarded as the optimal combination of personality development, with high levels of both subjective well-being and social-cognitive maturity considered *eudaimonia*, the notion of human flourishing and fulfilment (Bauer & McAdams, 2010; King & Hicks, 2007).

Although maturity is multifaceted and these two aspects are not exhaustive regarding all the characteristics which might be associated with maturity, both elements are important when exploring what it means to be mature (King & Hicks, 2006). While subjective well-being and social-cognitive maturity appear to operate independently (Helson & Wink, 1987; McCrae & Costa, 1983) so that people who can think in complex ways about their lives can be happy or unhappy (Bauer & McAdams, 2004), these aspects considered together more fully encompass the notion of maturity. For example, low negative affectivity and high positive affectivity might not necessarily reflect other facets of maturity such as insight, wisdom, and compassion, while cognitive complexity might miss aspects of self-acceptance and contentment also

associated with maturity (King & Hicks, 2007). It is also important to note that coping with life-changing experiences may lead to important outcomes that are independent of happiness (King & Hicks, 2006), which may be particularly relevant when considering the transition to parenthood.

Given the different theoretical conceptualisations of psychological maturity it is not surprising that there is little consensus regarding empirical measures. Previous approaches in the parenthood literature have included clinical interviews tapping multiple facets of psychological makeup such as life adaptation (Grossman, et al., 1980), ego strength (Heinicke, et al., 1983; Shereshefsky & Yarrow, 1973), psychological integration (Benn, 1986; Mercer, 1986), measures of ego development (Hauser et al., 1984), ego resiliency (van Bakel & Riksen-Walraven, 2002), hardiness (Johnson & McMahon, 2008), and composites of multiple measures (Belsky & Barends, 2002).

The conceptualisation of psychological maturity in the current research attempted to encompass characteristics thought likely to contribute to the psychological redefinition required during the transition to parenthood, and also capacities important for positive adjustment to parenting and infant caregiving, as well as aspects of both social-cognitive maturity and social-emotional well-being. Specifically, these characteristics involve the ability to tolerate ambivalence and negative affect, control impulses, take another's perspective, and demonstrate adaptation competence, defined as an efficient, calm, persistent, and flexible approach to problem solving (Belsky, 1984; Bornstein, 2002; Cohen & Slade, 2000; Heinicke, 1984; Mercer, 1985; Rubin, 1984). Three measures were used in the current research: ego resiliency, hardiness, and ego development.

### **Ego Resiliency and Hardiness**

The constructs of ego resiliency (Block & Block, 1980) and hardiness (Maddi & Khoshaba, 1994) share considerable common ground in that both involve flexibility, adaptation, and internal control in the face of changing environments. They are regarded as self-regulatory capacities believed to tap the dynamic properties of the self-system, specifically the ability of the self to execute and integrate psychological functions in order to adaptively respond to potentially stressful experiences (Gramzow, Sedikides, Panter, & Insko, 2000). Self-regulatory capacities have been considered indices of maturity (Helson & Wink, 1987) and shown to be important during major developmental tasks such as life transitions, and are believed to be an integral component of well-being (Busch & Hofer, 2012; Gramzow, et al., 2000; Hofer, Busch, & Kärtner, 2011).

Ego resiliency reflects resourceful adaptation to situational demands achieved by flexibly altering the degree of ego (impulse) control to enhance coping abilities (Gramzow, et al., 2000). This is achieved through behavioural shifts, versatile use of cognitive and social strategies, accommodation and assimilation, and the ability to work towards a distant goal (Block & Block, 2006). Klohnen (1996) reported that ego resiliency combines a number of distinct personality attributes enabling flexibility and adaptive responding to environmental contingencies so that ego resilient individuals are positive, competent, perceptive, and have a capacity for warm and open relationships. In terms of the relevance of ego resiliency for adaptation to parenthood, studies have reported that ego resiliency is related to adjustment and effective functioning in challenging life transitions (Klohnen, Vandewater, & Young, 1996), satisfaction with mothering (Paris & Helson, 2002), and more optimal parenting with 15-month old children (van Bakel & Riksen-Walraven, 2002).

Similarly, hardiness is described as a personality style characterised by flexibility, adaptation, and a sense of internal control in the face of changing environments (Kobasa, 1979; Kobasa, Maddi, & Kahn, 1982; Maddi & Khoshaba, 1994). Hardiness is theorised to have three dimensions: commitment, control, and challenge so that a hardy person views potentially stressful events as meaningful and interesting (commitment), changeable (control), a normal part of life and an opportunity for growth (challenge) (Funk, 1992). Hardiness is believed to involve cognitive appraisals that support a tolerable interpretation of potential stressors (Gramzow, et al., 2000), help structure interactions, and provide motivation to do difficult things (Maddi, 2002). Although the benefits of hardiness are frequently examined in the contexts of stress, illness, and organisational performance (Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011), more recently hardiness has been explored in relation to parenthood. As noted earlier, McMahon and colleagues (McMahon, et al., 2007) found that women aged 38 and older scored higher on a measure of hardiness in pregnancy than women aged 35 or less, while Johnson and McMahon (2008) reported that hardiness was related to more adaptive parenting cognitions which contributed to greater limit setting around bedtime interactions leading to fewer child sleep problems in preschool aged children. Hardiness has also been identified as an important predictor of adjustment for both mothers and fathers following fetal/infant death (Lang, Goulet, & Amsel, 2004).

Both ego resiliency and hardiness are thought to be relatively stable personality characteristics resulting from both genetic factors and early familial experience, however, as personality traits have been shown to continue to change throughout adulthood (Caspi, Roberts, & Shiner, 2005; Diehl & Hooker, 2013), further development in the context of life experience is possible (Block & Block, 1980; Maddi,

2002; Paris & Helson, 2002). For example, ego resiliency has been found to be responsive to developmental processes, such as identity consolidation (Pals, 1999) and motherhood (Paris & Helson, 2002), increasing and decreasing in response to positive and negative life outcomes, respectively. Similarly, hardiness is believed to develop from repeated experiences of turning adversity into opportunity as part of the ongoing developmental process (Maddi, 2002; Maddi, et al., 2011).

### **Ego Development**

The alternate, social-cognitive perspective of psychological maturity involves the complexity and coherence individuals demonstrate in thinking about the self and others (Bauer & McAdams, 2004), typically assessed using Loevinger's construct of ego development (1976), an approach derived from Piaget's developmental stage theory (Piaget, 1952). Ego development is proposed to be a 'master trait' involving a sequence of increasingly more mature levels of impulse control, cognitive complexity and interpersonal concerns. Loevinger proposed eight stages of ego development beyond the pre-social infancy stage, from the earliest 'impulsive' stage normally apparent in young children and characterised by little impulse control and simplistic thinking, progressing through to the highest, rarely attained 'integrated' stage involving very high impulse control and a high tolerance for ambiguity and paradoxes. Similar to Piaget's approach to development, each stage is concerned with a qualitatively more complex way of thinking, perceiving, and organising experience. Ego development is believed to be an integrative cognitive process for dealing with intrapersonal and interpersonal experiences, providing a frame of reference from which each person makes sense of themselves and the world (Manners & Durkin, 2001). Assessed from a projective sentence completion test (Hy & Loevinger, 1996), ego development has been described



as a “comprehensive measure of maturity assessing development within many domains” (Cohn, 1998, p. 133).

Loevinger (1976) proposed that age is a necessary but not sufficient condition for reaching higher stages of ego development and empirical studies have generally found that ego development increases over the early years and stabilises in early adulthood (Cohn, 1998). Movement through the stages is influenced by certain kinds of environmental stimulation, such as cognitive development through education that exposes students to different perspectives, and life experiences that challenge expectations (Cohn, 1998; Manners & Durkin, 2000). Although ego development can remain stable throughout adulthood, restructuring and further development is thought possible through a process of equilibration (Piaget, 1977) whereby life experiences that are challenging, require new ways of thinking, and effortful adaptation have the potential to precipitate ego development (Helson & Roberts, 1994; Manners & Durkin, 2000).

As with ego resiliency and hardiness, little empirical attention has been devoted to ego development and its impact on parenting, but associations have been reported between higher levels of ego development and more positive affect and mutual gaze during interactions between mothers and 8-month old infants (Levine, Garcia-Coll, & Oh, 1984 as cited in Belsky & Barends, 2002), and more supportive and encouraging comments between parents and their adolescent children (Hauser, et al., 1984).

Together these three constructs encompass the adaptive flexibility, regulatory capacities, and perspective taking theorised to account for optimal adaptation during the transition to motherhood. The aim of the current research was to examine firstly, whether older age is associated with greater psychological maturity assessed using these three constructs, and secondly, whether maturity provides any benefits during the

transition to first-time motherhood. The next section details the study design and participants before the three research papers are presented in subsequent chapters.

### **The Present Study**

#### **The Parental Age and Transition to Parenthood Australia Study**

Given previous equivocal findings and methodological limitations of studies concerned with motherhood at older ages, a large prospective Australian study, the Parental Age and Transition to Parenthood Australia (PATPA) study, was designed to examine adjustment (psychological, social, and health) in pregnancy and early parenthood in older first-time mothers whilst taking into account mode of conception and other relevant contextual factors.

Findings from the pregnancy phase (McMahon, Boivin, Gibson, Hammarberg, et al., 2011) showed that irrespective of mode of conception, older maternal age was associated with greater psychological hardiness, a more supportive partner relationship, and fewer symptoms of anxiety and depression in pregnancy. Hardiness and partner relationship attenuated the impact of age on pregnancy mood with hardiness the variable most strongly associated with positive pregnancy mood. This finding provides empirical support for the notion that psychological maturity may be an advantage of older motherhood, particularly in pregnancy, and warrants further investigation.

Postnatal findings from the PATPA study showed that neither older maternal age nor mode of conception were associated with episodes of major depression assessed by structured diagnostic interview in the first four months of motherhood (McMahon, Boivin, Gibson, Fisher, et al., 2011), but the authors noted the need to further consider subclinical indices of wellbeing and age-related protective factors.

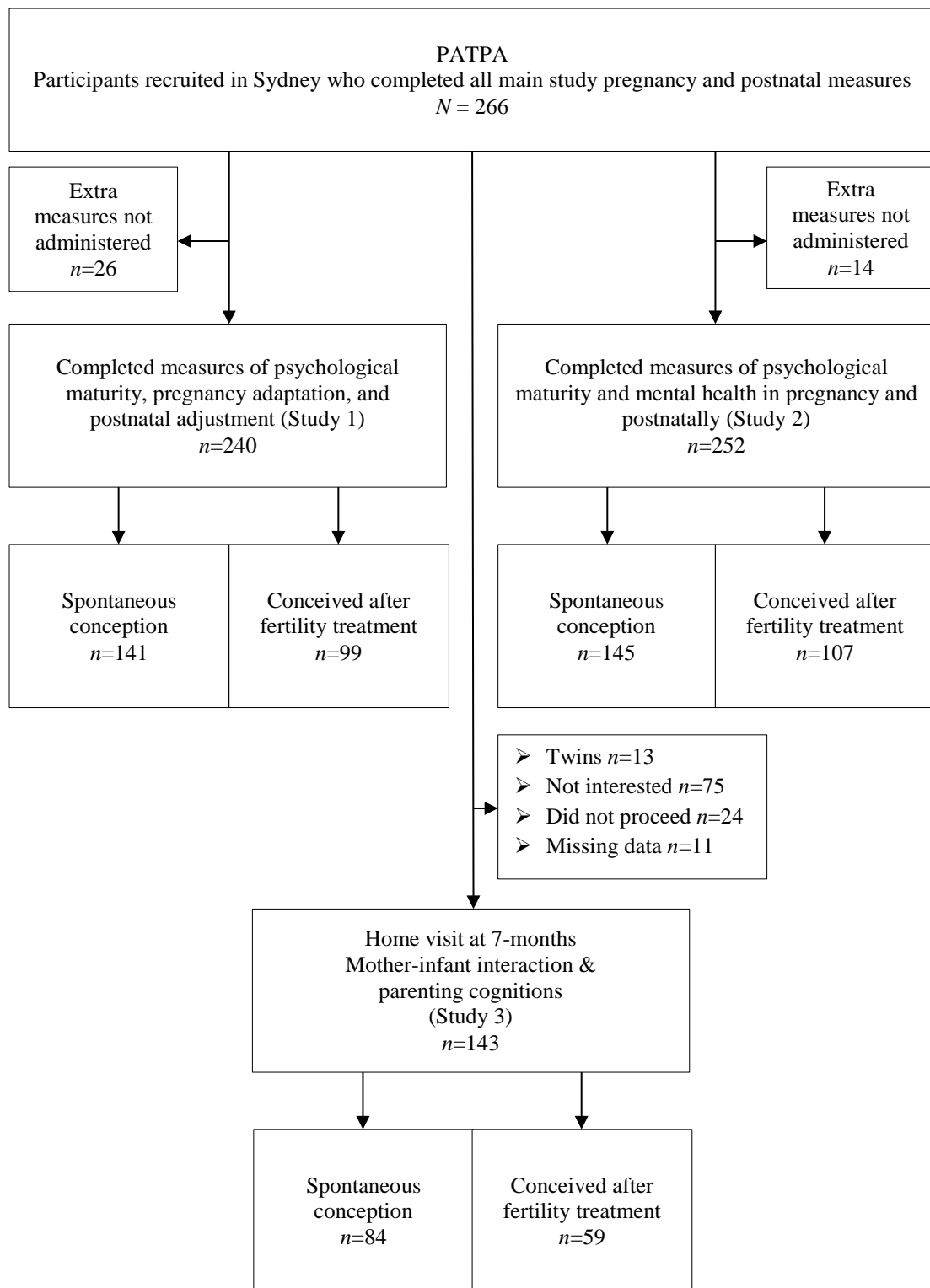
The current research sought to undertake a more in-depth investigation of psychological maturity as a protective factor for older mothers during the transition to parenthood. This involved administering additional measures of psychological maturity and adaptation to parenthood to a subsample of PATPA participants, some of whom also agreed to participate in an optional home visit when infants were aged 7-months to enable observational measures of parenting to be obtained. Ethics approval for the additional home visit component of the study was sought from the Human Research Ethics Committee at Macquarie University and approved under protocol number HE23FEB2007-R04994 (see Appendix A).

### **Participants**

The sampling strategy of the PATPA study involved recruiting approximately equal numbers of pregnant women, both spontaneous and assisted conception, stratified across three age groups: ‘younger’,  $\leq 30$  years; ‘middle’, 31–36 years; and ‘older’,  $\geq 37$  years. Older was defined as 37 years or older, which is the age at which fertility decline accelerates and which has been proposed as the logical point of definition for the beginning of advanced reproductive age (Gleicher, Weghofer, & Barad, 2007). Younger was defined as below the median age of birth in Australia at the time of the study, which was 31 years (Australian Bureau of Statistics, 2008). The recruitment strategy meant that older women and women who conceived using fertility treatment were oversampled relative to prevalence in the childbearing population of Australia. English speaking, nulliparous pregnant women, aged 20 years or older (teenagers were excluded) were recruited from ART clinics, and public and private antenatal clinics and classes in nearby hospitals in two large Australian cities, Sydney and Melbourne. Only a subsample of participants in metropolitan Sydney completed measures relevant to the current research and these participants are discussed below.

In Sydney, a total of 519 eligible women were provided with information about the PATPA study, 317 (61%) consented to participate, and 266 (84% of consenting women) completed all antenatal and postnatal measures. Information regarding the women who did not participate was not available. Of the 266 women who did participate, 240 (90% of these) completed additional measures relevant to the first study presented in Chapter 3 (Study 1), while 252 (95% of consenting women) completed the measures relevant to the study presented in Chapter 4 (Study 2). At four months postpartum, women in the PATPA study who had given birth to a single baby ( $n = 253$ ) were invited to participate in an optional home visit when their baby was seven months of age. Seventy percent ( $n = 178$ ) of women expressed interest, with 154 (87% of interested women) subsequently completing the home visit. Due to incomplete data for 11 women, data reported in the study in Chapter 5 (Study 3) concerns 143 women and their babies.

The majority of participants were tertiary educated, in established relationships, worked in professional occupations, and spoke only English at home. Specific sample demographics for each study are presented more fully in the papers appearing in subsequent chapters. Women were classified as having conceived with ART if conception involved using oocyte retrieval and embryo transfer using fresh or frozen embryos. Very few participants conceived using donor gametes; two used donor eggs and two used donor sperm, and the impact of this was not specifically considered in any of the studies. A small number of women reported conception after pharmacological ovulation induction or artificial insemination and they were grouped together with women who conceived using ART as the 'fertility treatment' group. Figure 1 summarises the number of participants who completed measures relevant for each of the three studies as well as the mode of conception for the participants in each study.



*Figure 1.* Participant numbers and mode of conception for each study

Although adaptation during the transition to motherhood for women with twins is likely to differ to that of women with a single baby in some respects (Ross, et al., 2011; Thorpe, Greenwood, & Goodenough, 1995), due to the small number of participants who were expecting twins (nine in Study 1, 12 in Study 2), those participants were retained in the two studies reliant on self-report data but were not included in the observational research phase presented in Study 3.

Recruitment was undertaken using age groups to ensure adequate representation of participants across the childbearing-age spectrum and sufficient numbers of women conceiving with assistance in each age category, however, statistical analyses were undertaken using age as a continuous variable. Although ‘older’ age was defined as being 37 years or older for recruitment purposes, results report associations among age and study outcomes rather than differences between age groups, therefore findings with respect to ‘older’ mothers speak to increasing age across the age range of participants rather than women aged over a certain age cutoff. However, demographic data is presented in each study by age and mode of conception categories for comparative purposes.

### **Design and Procedure**

The current research had a prospective longitudinal design with data collected at three time-points. In the third trimester of pregnancy, participants undertook a telephone interview and completed a series of questionnaires either online or in hardcopy, which they returned by mail. Demographic data regarding education, language spoken at home, relationship history, employment, fertility history, and mode of conception were obtained, and participants completed self-report measures of mood, health, formation of a maternal identity, fetal attachment, and the three measures of

maturity discussed above. At around four months postpartum, participants completed further questionnaires (again either online or in hardcopy) and another telephone interview where information regarding the birth and the baby was provided. Questionnaires assessed maternal and infant health, maternal mood, infant temperament, partner relationship, life events, and adjustment to motherhood. Participants also indicated whether they were interested in participating in an optional home visit when infants were aged approximately 7-months.

Participants who indicated interest were contacted around six months postpartum and a home visit was booked for those who wished to proceed. The home visit involved a 15 minute mother-infant play interaction using a set of toys provided by the researcher, which was filmed and later assessed for maternal sensitivity and mind-mindedness. Participants also completed questionnaires regarding parenting control cognitions and parenting distress on the researcher's laptop. A summary of the study protocol and key variables considered in the current research appears in Table 1.

### **Study Aims and Research Questions**

The aim of the study was to examine whether older maternal age is associated with greater psychological maturity and whether greater psychological maturity provides any adaptive benefit during the transition to motherhood. This aim was addressed in three papers, which sought to answer research questions as follows:

1. Age, Psychological Maturity, and Maternal Adaptation
  - a. Is age associated with greater psychological maturity in pregnancy?
  - b. Are age and maturity related to maternal adaptation in pregnancy and the early months of parenthood and do age effects operate via psychological maturity?

- c. Does pregnancy adaptation predict postnatal adjustment?

## 2. Age, Psychological Maturity, and Maternal Mental Health

- a. Is age-related psychological maturity protective for mental health in pregnancy and the early months of parenthood?
- b. Does maturity contribute to a more optimal context for early parenthood by positively impacting factors known to contribute to postpartum mental health?

## 3. Maternal Age, Psychological Maturity, Parenting Cognitions, and Mother-Infant Interaction

- a. Is maternal age associated with two aspects of observed parenting quality in infancy, namely sensitivity and mind-mindedness?
- b. Do age effects operate via greater psychological maturity and more adaptive parenting cognitions?

It was anticipated that older women would be more psychologically mature and maturity would contribute to an optimal transition to parenthood and responsive parenting at 7-months, given previous findings of some advantages of older parenthood and speculation regarding possible underlying psychological mechanisms (e.g. Barnes, et al., 2013; Bornstein, et al., 2006; Ragozin, et al., 1982). Given the increased likelihood that women conceiving at an older age may require medical assistance to conceive, each study specifically considered whether the associations established in the models examined applied for women conceiving after fertility treatment as well as those conceiving spontaneously. Other contextual and socio-demographic factors relevant to each study were also considered.



Table 1  
Summary of Study Protocol, Measures and Variables

Procedure/Measure	Variable	Study
Pregnancy (3 <sup>rd</sup> Trimester)		
Telephone interview	Age, education, relationship, language, employment, fertility & conception history	1, 2, 3
<i>Personal Views Survey 3<sup>rd</sup> Edition, Revised</i> <sup>1</sup>	Hardiness	1, 2, 3
<i>Ego Resiliency Scale</i> <sup>2</sup>	Ego resiliency	1, 2
<i>Washington University Sentence Completion Test</i> <sup>3</sup>	Ego development	1, 2
<i>Maternal Fetal Attachment Scale</i> <sup>4</sup>	Fetal attachment	1
<i>Childbearing Attitudes Questionnaire</i> <sup>5</sup>	Identification with motherhood & maternal self-confidence	1
<i>Edinburgh Depression Scale</i> <sup>6</sup>	Symptoms of depression	2
<i>State-trait Anxiety Inventory</i> <sup>7</sup>	Symptoms of anxiety	2
<i>SF-12</i> <sup>8</sup>	Physical health Emotional health	1, 2 2
4-6 Months Postpartum		
Telephone interview	Gestation at birth, infant gender, birth weight, birth method, social support*	1, 2*, 3
<i>Experience of Motherhood Questionnaire</i> <sup>9</sup>	Adjustment to motherhood	1
General infant health question	Infant health	1
<i>Short Temperament Scale for Infants</i> <sup>10</sup>	Infant temperament	2, 3
<i>Intimate Bonds Measure</i> <sup>11</sup>	Partner relationship	2
<i>Edinburgh Postnatal Depression Scale</i> <sup>6</sup>	Symptoms of depression	2
<i>State-trait Anxiety Inventory</i> <sup>7</sup>	Symptoms of anxiety	2
<i>SF-12</i> <sup>8</sup>	Physical health Emotional health	1, 2 2
Recent distressing life events question	Life events	2
7 Months Postpartum		
15 minute mother-infant interaction	Maternal Sensitivity <sup>12</sup> Mind-mindedness <sup>13</sup>	3 3
<i>Parental Locus of Control Scale</i> <sup>14</sup>	Parenting cognitions	3
<i>Parenting Stress Index-Short Form</i> <sup>15</sup>	Parental distress	3

<sup>1</sup> Maddi & Khoshaba, 2001      <sup>6</sup> Cox, Holden, & Sagovsky, 1987      <sup>11</sup> Wilhelm & Parker, 1988

<sup>2</sup> Block & Kremen, 1996      <sup>7</sup> Spielberger, Gorsuch, & Lushene, 1983      <sup>12</sup> NICHD Early Child Care Research Network, 1999

<sup>3</sup> Short form; Hy & Loevinger, 1996)      <sup>8</sup> Ware, Kosinski, & Keller, 1996      <sup>13</sup> Meins & Fernyhough, 2010

<sup>4</sup> Cranley, 1981      <sup>9</sup> Astbury, 1994      <sup>14</sup> Campis, Lyman, & Prentice-Dunn, 1986

<sup>5</sup> Ruble et al., 1990      <sup>10</sup> Sanson, Prior, Garino, Oberklaid, & Sewell, 1987      <sup>15</sup> Abidin, 1995

The three research papers are presented in the subsequent chapters in the form of manuscripts submitted for publication to the journals indicated, and are formatted according to the requirements of that journal. For ease of reading, tables and figures are integrated.

The first author of each paper is the candidate, who conceptualised the studies, undertook data collection, statistical analyses, literature searches, and wrote the first draft of all manuscripts. The co-authors are her supervisors who advised on the design, analyses and contributed to the preparation of all manuscripts, and were the principal investigator and chief investigators, respectively, of the PAPTA study. There is necessarily some repetition across the papers regarding participants, sampling and measures, and aspects of previous empirical findings and theoretical exposition appearing in this chapter are variously repeated in the relevant research paper.

Following the three research papers, Chapter 6 presents a general discussion of findings, study strengths and limitations, and the implications of this research.

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## **Chapter 3:**

### **Age, Psychological Maturity and Maternal Adaptation**

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### Author Contributions

Author Anna-Lisa Camberis contributed to the methodology and conceptualisation of the present study, undertook data collection and data analyses, and wrote the first draft of the manuscript, including the revised draft for publication. Authors Catherine McMahon, Frances Gibson, and Jacky Boivin wrote the protocol for the larger prospective study from which the data in the current study was obtained and contributed to study conceptualisation, statistical analyses, and revisions of the manuscript.



### **Abstract**

In the context of the trend toward delayed parenthood, this study examines whether older maternal age is associated with greater psychological maturity, and whether greater psychological maturity provides any adaptive benefit during the transition to motherhood. A sample of 240 predominantly English-speaking Australian women in a metropolitan area expecting their first baby (mean age = 32.81 years; 41% conceived after fertility treatment) completed measures of psychological maturity (hardiness, ego development, and ego resiliency) and pregnancy adaptation (maternal fetal attachment and formation of a maternal identity) in the third trimester of pregnancy, and a measure of postnatal adjustment at 4-6 months postpartum. Structural equation modelling showed age was positively associated with a latent construct of psychological maturity, and psychological maturity was associated with more optimal adaptation in pregnancy and early motherhood. Both psychological maturity and pregnancy adaptation predicted positive postnatal adjustment. Age was indirectly related to adaptation through its relationship with psychological maturity. The relationships in the model applied regardless of mode of conception (fertility treatment or spontaneous). Potentially confounding contextual factors associated with older motherhood, higher education and maternal and child health, were included in the model. These results suggest that psychological maturity is a benefit of motherhood at older ages.

*Keywords:* maternal age, psychological maturity, pregnancy adaptation, transition to motherhood

## **Introduction**

More women are becoming mothers over the age of 35 (Australian Bureau of Statistics, 2011; Office of National Statistics, 2012; U.S. Census Bureau, 2012). Older women are more likely to require assisted reproductive technologies (ART) to conceive (Collins & Crosignani, 2005) and also face increased risks of pregnancy and birth complications (Carolan & Frankowska, 2011). However, older first-time mothers are more likely to be better educated, financially secure, and bring with them psychological resources which may positively contribute to their parenting ability (Bornstein, Putnick, Suwalsky, & Gini, 2006; Sutcliffe, Barnes, Belsky, Gardiner, & Melhuish, 2012). Few studies of the effects of older maternal age on adjustment to parenthood have considered that these contextual factors might confound results. Additionally, research focusing on the psychological correlates of older maternal age and the processes linking age and child or maternal outcomes is lacking (Bornstein, et al., 2006; Fergusson & Woodward, 1999).

## **Adaptation during the Transition to Motherhood**

In the transition to parenthood, a woman integrates the role of mother into her sense of self and forms a relationship with her infant, with these developmental tasks beginning in pregnancy (Cranley, 1981; Leifer, 1980; Mercer, 2004). The early months following birth are particularly challenging (Mercer, 1986), but by four to five months postpartum many women reach a turning point characterized by greater competence, a sense of achievement, more rewarding interactions, and acceptance of normal feelings of ambivalence about the baby and associated life changes (Carolan, 2005; Mercer, 1986).

Research confirms that pregnancy adaptation predicts competence and fulfilment as a mother (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988; Kiehl & White, 2003), which, in turn, is associated with the development of a healthy mother-infant relationship (Cohen & Slade, 2000; Siddiqui & Hägglöf, 2000). Effects can be lasting with early maternal adjustment found to be associated with children's emotional and behavioural functioning at age six (Anhalt, Telzrow, & Brown, 2007).

### **Age and Adaptation during the Transition to Motherhood**

Results of studies comparing adaptation between older and younger mothers are difficult to reconcile due to differences in the definition of 'older' and failure to account for possible confounds. For example, the threshold for older age seems to vary with the year of publication, from age 30 (Gottesman, 1992; Mercer, 1986) to age 35 (Berryman & Windridge, 1996; Carolan, 2005) and more recently age 38 (Boivin et al., 2009; McMahon, Gibson, Allen, & Saunders, 2007) and 40 (Sutcliffe, et al., 2012). Nevertheless, the few prospective studies report generally positive adjustment for older women in pregnancy (Berryman & Windridge, 1996; Gottesman, 1992; Windridge & Berryman, 1996), although a recent review found the relationship between maternal age and prenatal attachment remains unclear (Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009).

Studies examining maternal age and postnatal adjustment also report inconsistent findings. Older maternal age has been associated with better adaptation (Grossman, Eichler, & Winickoff, 1980; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982), less gratification with mothering (Mercer, 1986), and comparable adjustment to younger mothers (Windridge & Berryman, 1996). Carolan (2005) reported that older mothers may take longer to adapt to motherhood, while Bornstein et al. (2006) found an association between older maternal age and a tendency to perceive

infants as more difficult or have more difficulty coping with the normative challenges of newborn behavior.

### **Contextual Factors Associated with Older Maternal Age**

Many women conceiving later in their reproductive life-cycle require medical assistance (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012). Few studies of age and maternal adaptation consider that conception using ART might confound results, whereas studies of mothers conceiving using ART generally control for maternal age thereby obscuring its effects. A recent review of studies comparing adaptation to early parenthood in women conceiving using ART and those conceiving spontaneously (Hammarberg, Fisher, & Wynter, 2008) concluded that findings are equivocal. While many studies report comparable adjustment irrespective of mode of conception, one group of researchers report higher rates of early parenting difficulties among ART mothers (Fisher, Rowe, & Hammarberg, 2012), and more intense fetal attachment during pregnancy (Fisher, Hammarberg, & Baker, 2008). They speculate that the struggle to conceive may lead these women to idealise pregnancy, thus making them vulnerable in early motherhood, although they acknowledge the possible contribution of older maternal age and associated perinatal complications. The only study to explicitly examine age effects in women conceiving with ART found older first-time mothers reported less identification with motherhood in pregnancy than younger ones, while prenatal attachment was comparable (McMahon, et al., 2007).

Higher education and potentially poorer health are additional contextual factors associated with older motherhood that may confound results. Many studies report higher rates of tertiary education in older mothers (Schmidt, et al., 2012), but few statistically control for its effects. There is also a view that older mothers may experience less optimal health (Berryman & Windridge, 1998) due to higher rates of

pregnancy and birth complications and medical intervention at birth (Carolan & Frankowska, 2011), while their infants have a greater likelihood of preterm birth or low birth weight (Dickinson, 2012), all of which may adversely impact maternal adjustment (Mercer, 1986). Finally, older parents with longer relationships may have a different relationship context to earlier-conceiving couples, for example, less expressed warmth (Boivin, et al., 2009), or conversely more adaptive coping strategies (Bowman, 1990), which might also impact maternal adjustment.

### **Age and Psychological Maturity**

Older age is often conceptualised as a proxy for maturity (Bornstein, et al., 2006), and personal maturity is proposed to predict maternal adaptation (Garrison, Blalock, Zarski, & Merritt, 1997; Gottesman, 1992). In their multi-dimensional models of the determinants of parenting, both Belsky (1984) and Heinicke (1984) identify parental psychological resources as particularly important. Similarly, maternal pre-birth psychological characteristics (e.g., ego strength, life adaptation), often referred to as indicators of maturity, have been found to predict better adjustment to parenthood (Grossman, et al., 1980; Shereshefsky & Yarrow, 1973). Research supporting the contention that older mothers possess psychological attributes as a result of their age that may enhance parenting abilities is limited (Belsky & Barends, 2002; Harker & Thorpe, 1992). Qualitative and quantitative studies have described the perceived benefits of older maternal age, including personal growth, maturity, preparedness for motherhood (Carolan, 2005; Frankel & Wise, 1982), greater psychological flexibility and integration (Mercer, 1986) and hardiness (McMahon, et al., 2007). These characteristics may contribute to better adjustment, but this has not been empirically confirmed. The aim of the current study is to systematically examine the relationships

among age, psychological maturity, and adaptation during the transition to motherhood while also accounting for the effects of contextual variables.

### **Indices of Psychological Maturity**

There is little consensus regarding empirical measures of psychological maturity in the parenting literature. Previous approaches have included clinical interviews tapping facets of psychological makeup such as life adaptation (Grossman, et al., 1980), ego strength (Heinicke, Diskin, Ramsey-Klee, & Given, 1983; Shereshefsky & Yarrow, 1973), psychological integration and flexibility (Mercer, 1986), and measures of ego development and ego resiliency (Belsky & Barends, 2002). Three measures were used in the current study to tap those characteristics proposed to contribute to optimal adaptation during the transition to motherhood, namely the ability to tolerate ambivalence and negative affect, control impulses, demonstrate adaptation competence, and take another's perspective (Belsky & Barends, 2002; Cohen & Slade, 2000; Heinicke, et al., 1983).

From a self-regulatory perspective, the constructs of ego resiliency (Block & Block, 1980), and hardiness (Kobasa, Maddi, & Kahn, 1982) involve flexibility, resourceful adaptation, and internal control in the face of changing environments and stress. Both are thought to be relatively stable personality characteristics resulting from genetic factors and early familial experience, with further development in the context of life experience possible (Block & Block, 1980; Maddi, 2002). Ego resiliency has been found to increase and decrease in response to positive and negative life outcomes (Paris & Helson, 2002). Similarly, hardiness is believed to develop from repeated experiences of turning adversity into opportunity (Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011).

A social-cognitive conceptualisation of psychological maturity examines the complexity individuals demonstrate in thinking about the self and others (Manners & Durkin, 2001). This capacity is typically assessed using Loevinger's (1976) construct of ego development that proposes successively more mature levels of impulse control, cognitive complexity and interpersonal concerns. Ego development has been found to increase over the early years and stabilise in early adulthood, but further development is believed to be possible in light of challenging life experiences requiring new ways of thinking and adapting (Manners & Durkin, 2000).

Although some of these constructs have previously been considered as indices of psychological maturity in studies of parenting behaviour (Belsky & Barends, 2002; Johnson & McMahon, 2008; van Bakel & Riksen-Walraven, 2002), it has not been established whether they are also involved in maternal adaptation in pregnancy and the early post-natal months.

### **The Present Study**

The present study sought to explore the proposition that psychological maturity could be an advantage of older motherhood across the transition to parenthood using data from a prospective study examining parental age and the transition to parenthood in Australia (PATPA). Results from this study have previously shown associations among age, hardiness and adjustment during pregnancy (McMahon et al., 2011). To test our proposal we used a two-step modelling approach and included multiple measures of psychological maturity and adaptation to parenthood. The measurement model investigated the underlying latent constructs of psychological maturity (ego resiliency, hardiness, ego development), pregnancy adaptation (maternal fetal attachment, identification with motherhood, maternal self-confidence), as well as postnatal adjustment (adaptation to life change as a result of motherhood) at 4-6 months

postpartum. The structural model examined relations among the latent dimensions together with maternal age, while controlling for education and maternal and infant health.

We predicted that older mothers would be more psychologically mature, that maturity would be related to more optimal adaptation in pregnancy and early motherhood, and that greater adaptation in pregnancy would predict more optimal postnatal adjustment. The direct and indirect effects of age (via maturity) on maternal adjustment were tested and we predicted only significant indirect associations. Given the increased likelihood that older women may require medical assistance to conceive, we also investigated whether the structural model was invariant across mode of conception. Finally, model testing took into account the effects of tertiary education and health.

## **Method**

### **Participants**

For the PATPA study, English speaking, nulliparous pregnant women, aged 20 years or older were recruited from ART clinics and antenatal classes in public and private hospitals in the vicinity of the clinics in two large Australian cities (Sydney and Melbourne). An explicit focus on maternal age and mode of conception informed recruitment of approximately equal numbers of pregnant women, both spontaneous and assisted conception, stratified across three age groups: ‘younger’, 20–30 years; ‘middle’, 31–36 years; and ‘older’,  $\geq 37$  years. ‘Older’ was defined as 37 years or older, the age at which fertility decline accelerates (Gleicher, Weghofer, & Barad, 2007). ‘Younger’ was defined as below the median age of birth (31 years) in Australia at the time (Australian Bureau of Statistics, 2008). This paper reports only on those women recruited in Sydney who completed additional measures for this study.



Five hundred and nineteen eligible women were provided with information about the study, 317 (61%) consented to participate, 266 (84% of consenting women) completed all baseline measures in the larger study, and 240 (90% of these) also completed the additional measures relevant to the current study. Subsequent information concerns these 240 women. Of the sample, 59% ( $n = 141$ ) conceived spontaneously, 35% ( $n = 83$ ) following ART, and 7% ( $n = 16$ ) had other fertility treatment (fertility drugs, ovulation induction, or intrauterine insemination) but not ART. The latter two groups were combined to form the ‘fertility treatment’ group. As shown in Table 1, most pregnancies were planned, and the majority of participants had a partner, were university educated, in professional occupations, and came from an English-speaking background. In keeping with older maternal age, caesarean section rates were high (45%). Most babies (94%) were born at or close to term. Nine women (approximately 4%) gave birth to twins. The infants were 125 boys and 124 girls.

## Procedure

After gaining approval from relevant institutional ethics committees, consenting women participated in a structured telephone interview and completed a battery of questionnaires in the third trimester of pregnancy ( $M_{\text{gestation}} = 31$  weeks,  $SD = 2$  weeks) and again between 4 – 6 months post-partum ( $M_{\text{babyage}} = 19$  weeks,  $SD = 3$  weeks).

## Measures

**Demographic and Reproductive History.** In pregnancy, participants provided information regarding age, mode of conception, fertility treatment, whether the pregnancy was planned, education, partner and employment status, and language(s) spoken at home. Postnatal information included infant gestation, gender, and type of birth.

The measures completed in the third trimester of pregnancy were:

**Psychological Maturity.**

**Hardiness.** The Personal Views Survey 3<sup>rd</sup> Edition, Revised (PVS-III-R; Maddi & Khoshaba, 2001) is an 18-item questionnaire designed to assess psychological hardiness, a personality trait involving the ability to transform stressful experiences into opportunities for learning and personal development. Items are responded to on a 4-point scale from 0 (*not true at all*) to 3 (*very true*). Items form three subscales; commitment (being involved; e.g., “Trying your best at what you do usually pays off in the end”), control (being an initiator; e.g., “Most of the time, people listen carefully to what I have to say”), and challenge (continual learning; e.g., “Changes in routine provoke me to learn”). A higher total summed score for all the combined scale items (range 0 - 54) indicates greater hardiness. Reliability for the total scale was satisfactory (Cronbach’s  $\alpha = .79$ ).

**Ego resiliency.** The 14-item Ego Resiliency Scale (ER89; Block & Kremen, 1996) assesses the capacity for flexible and resourceful adaptation to changing circumstances (e.g., “I like to take different paths to familiar places”). Items are rated on a 4-point scale from 1 (*does not apply at all*) to 4 (*applies very strongly*). A higher score (range 14 - 56) indicates higher resiliency. Cronbach’s alpha reliability for the current sample was .83.

**Ego development.** Ego development was assessed using the Washington University Sentence Completion Test Short Form 81 (SCT; Hy & Loevinger, 1996), a projective test requiring participants to complete 18 sentence stems (the first 18 of the full 36-items were used). The short form has comparable validity and reliability to the full form (Novy & Francis, 1992). A trained coder analyzed responses to the sentence stems with reference to the coding manual (Hy & Loevinger, 1996) and assigned an ego

level rating based on Loevinger's (1976) nine stages of ego development (from the lowest level, E2 Impulsive, to the highest and rarely attained level, E9 Integrated). An independent coder scored 25% ( $n=60$ ) of protocols, with high agreement between the two ( $\kappa = .98$ ). The sum of all 18 items is recommended as the most reliable scoring method (Hy, Bobbitt, & Loevinger, 1998), with a higher score (range 36 -162) indicating higher ego development. Cronbach's alpha was .77.

### **Pregnancy Adaptation.**

***Maternal fetal attachment.*** The 24-item Maternal Fetal Attachment Scale (MFAS, Cranley, 1981) assesses the extent of affiliation with the unborn child (e.g., "I can almost guess what my baby's personality will be from the way s/he moves around"). Items are responded to on a 5-point scale from 0 (*definitely no*) to 4 (*definitely yes*), with a higher score (range 0 - 92) indicating more intense attachment. The item "I keep wondering what sex the baby is" was removed as many mothers now know the sex of their baby. Reliability was .81.

***Maternal identity formation.*** The Childbearing Attitudes Questionnaire (CAQ, Ruble et al., 1990) is a 60-item scale that measures attitudes and characteristics relevant to adjustment during the transition to parenthood. The CAQ consists of 16 subscales in four domains: Self-confidence, Negative Aspects of Giving Birth, Social Orientation, and Identification with Motherhood. Only items from the scales 'Identification with Motherhood' (17 items, e.g. "Being pregnant makes me feel fulfilled as a woman") and 'Maternal Self-Confidence' (four items, e.g., "I am certain I will be a good mother") were administered. Items are scored from 1 (*disagree strongly*) to 7 (*agree strongly*), with a higher summed score representing greater maternal self-definition (Identification with Motherhood range 17 - 119, reliability .77; Maternal Self-confidence range 4 - 28, reliability .85).

Table 1

*Participant Demographic and Contextual Characteristics by Age Group and Mode of Conception Group*

		<b>Age Group ≤ 30 <i>n</i> = 95</b>	<b>Age Group 31-36 <i>n</i> = 80</b>	<b>Age Group ≥ 37 <i>n</i> = 65</b>	<b>Total Sample <i>N</i> = 240</b>	<b>Spontaneous Conception <i>n</i> = 141</b>	<b>Fertility Treatment <i>n</i> = 99</b>
Age (years) <sup>1,2 a</sup>	M (SD)	28.22 (1.51)	33.31 (1.70)	38.89 (1.74)	32.81 (4.60)	31.72 (4.34)	34.36 (4.54)
Tertiary education	<i>n</i> (%)	58 (61%)	57 (71%)	46 (71%)	161 (67%)	100 (71%)	61 (62%)
English-only at home	<i>n</i> (%)	70 (73%)	63 (79%)	51 (79%)	184 (77%)	105 (75%)	77 (77%)
Professional Occupation	<i>n</i> (%)	66 (68%)	63 (79%)	54 (84%)	182 (76%)	109 (77%)	78 (80%)
Partnered	<i>n</i> (%)	95 (100%)	78 (97%)	63 (97%)	236 (98%)	138 (98%)	98 (99%)
Relationship duration (years) <sup>1,2</sup>	M (SD)	5.56 (3.02)	6.24 (3.44)	7.99 (4.95)	6.43 (3.87)	5.90 (4.03)	7.18 (3.50)
Fertility treatment <sup>1 b</sup>	<i>n</i> (%)	28 (30%)	31 (39%)	40 (40%)	99 (41%)	—	—
Unplanned pregnancy	<i>n</i> (%)	12 (13%)	10 (12%)	5 (8%)	27 (11%)	27 (11%)	0
Caesarean birth <sup>1,2</sup>	<i>n</i> (%)	38 (40%)	28 (35%)	41 (64%)	107 (45%)	55 (39%)	52 (53%)
Gestation at birth (weeks) <sup>2</sup>	M (SD)	39.34 (1.65)	39.49 (2.01)	39.22 (1.76)	39.36 (1.80)	39.65 (1.72)	38.94 (1.83)

*Note.* <sup>1</sup>Age-groups differ at  $p < .05$ . <sup>2</sup>Mode of conception groups differ at  $p < .05$ .

<sup>a</sup>Age range of participants 24 – 43 years. <sup>b</sup>Due to sampling strategy proportion not representative of general population.

**Pregnancy Health.** A single question from the SF-36 (Ware & Sherbourne, 1992) 'In general, would you say your health was: poor, fair, good, very good or excellent' (rated 1 to 5) was used. This question has been validated in epidemiological research, with objective measures of health (Stewart, Hays, & Ware, 1988) and is sensitive to ongoing health-related problems including symptoms of physical functioning and well-being (Schytt & Waldenström, 2007).

Measures completed 4-6 months postpartum were:

**Postnatal Adjustment.** The 20-item Experience of Motherhood Questionnaire (EMQ, Astbury, 1994) assesses the impact of motherhood in terms of maternal anxiety/concern (e.g., "I get so much different advice it is hard to know what is best for the baby"), coping (e.g., "I am coping with the stresses of parenthood"), personal autonomy (e.g., "I have time to pursue my own interests"), satisfaction (e.g., "I feel great fulfilment in looking after the baby"), maternal overload (e.g., "I need a break from the demands of the child"), and relationship change (e.g., "I feel cut off from my friends"). The 4-point response scale was from 1 (*not at all*) to 4 (*very much*). Scores were reversed and summed so that higher scores (range 20 - 80) reflected positive emotional wellbeing, high levels of coping, and satisfaction. Reliability was .81.

**Maternal Postnatal Health and Infant Health.** The single question from the SF-36 (Ware & Sherbourne, 1992) 'In general, would you say your health was: poor, fair, good, very good or excellent' (rated 1 to 5), also administered in pregnancy, was used to assess postnatal health. Mothers were similarly asked to rate their infant's health 'Overall, is your baby's health: poor, fair, good, very good or excellent' (rated 1 to 5).

**Data Analyses**

Preliminary analyses were undertaken to identify missing data and test for normality of continuous variables and assess bivariate relationships among all study variables. Structural equation modelling using AMOS (Version 19; Arbuckle, 2010) with full information maximum likelihood estimation (Arbuckle, 1996) was used to evaluate the model. To overcome the sensitivity to sample size problem inherent in the chi-square goodness of fit index, the following fit indices and criteria of a good fit were also used:  $\chi^2/df$  with a value less than 2 (Wheaton, Muthén, Alwin, & Summers, 1977), Tucker-Lewis index (TLI; Tucker & Lewis, 1973) and comparative fit index (CFI; Bentler, 1990) with cut-off values close to .95 (Hu & Bentler, 1999), and root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) with a value close to .06 (Hu & Bentler, 1999).

Initially, a measurement model was specified to investigate whether observed variables could be considered indicators of underlying latent factors representing dimensions of psychological maturity (ego resiliency, hardiness, ego development), pregnancy adaptation (maternal fetal attachment, identification with motherhood, maternal self-confidence) and postnatal adjustment (EMQ). Exploratory factor analysis suggested that the factor structure of the EMQ in this sample was different to that reported by Astbury (1994), potentially because the original sample comprised mothers of two-year old children and/or because those validation data were collected in 1989. The EMQ structure obtained comprised a relatively large number of factors (six) with a variable number of items per factors (some only one) arguing against these subscales being used as indicators for the measurement model. Given high overall scale reliability, we instead created four item parcels with EMQ items randomly allocated to each (Marsh, Hau, Balla, & Grayson, 1998). The creation of indicators using this

approach is recommended to improve psychometric properties (Nasser & Takahashi, 2003).

After assessing the adequacy of the measurement model, a structural model examined relations among the latent dimensions, together with maternal age while controlling for education and maternal and infant health. Lastly, a model invariance test was conducted using multi-group analysis to establish the equivalence of the relationships in the model across mode of conception groups ('fertility treatment' and 'spontaneous').

## **Results**

### **Preliminary Analyses**

Less than 5% of all questionnaire items were missing. Mean substitution was used on scales where fewer than 10% of items were missing (hardiness and ego resiliency). On the SCT, missing sentence completions were assigned an E4 rating (the modal rating) (Hy & Loevinger, 1996). The protocol was not rated if more than three sentence completions were missing ( $n = 6$ ). Variability in participant  $n$  is due to missing data on some measures. Assumptions of normality were satisfied. Two outliers (extreme low scores) were detected on maternal fetal attachment and these were changed to scores within three standard deviations of the mean (winsorized).

### **Bivariate Correlations**

Correlations and means and standard deviations of study variables are shown in Table 2. Pearson correlations show that all three maturity variables (ego development, hardiness, ego resiliency) were significantly inter-correlated, as were the three pregnancy adaptation variables (maternal fetal attachment, identification with motherhood, maternal self-confidence). Age was significantly positively associated with all maturity variables and only significantly related (negatively) with identification

with motherhood. Pregnancy health and maternal and infant health ratings were positively associated with hardiness, ego resiliency, and postnatal adjustment. Maternal postnatal health was also positively related to age.

Point-biserial correlations show that women who conceived after fertility treatment were significantly older, had higher fetal attachment and maternal self-confidence in pregnancy, and a higher rate of caesarean birth than women who conceived spontaneously. Older mothers also had a higher rate of caesarean birth as did women reporting poorer pregnancy health. Women with tertiary education had lower maternal self-confidence in pregnancy, higher pregnancy health ratings, and less optimal postnatal adjustment than women without a university degree. Postnatal adjustment and maternal and infant health were unrelated to relationship duration, gestation at birth, and infant age and gender and these variables were therefore not considered further (data not in table).

### **Model Testing**

The initial measurement model yielded a significant chi-square goodness of fit,  $\chi^2 = 66.19$ ,  $df = 32$ ,  $p < .001$ , and marginally adequate alternate fit statistics,  $\chi^2/df = 2.1$ , TLI = .91, CFI = .95, and RMSEA = .07 (90% CI [.04, .09]). Modification indices suggested a covariance between the residuals of the observed variables of maternal fetal attachment and identification with motherhood would achieve a better model fit. Inter-item correlations showed highest shared variance not accounted for by the latent construct 'pregnancy adaptation' between caretaking items (feeding and holding the baby), separate to other aspects of affiliation with the unborn child and formation of a maternal identity in pregnancy. The residuals of these two variables were therefore correlated and the model tested again.



Table 2  
Correlation Matrix and Means (M) and Standard Deviations (SD) of Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	M (SD)
1. Age in years	—													32.81 (4.60)
2. Hardiness	.21**	—												39.81 (5.47)
3. Ego resiliency	.19**	.60***	—											41.35 (6.15)
4. Ego development (n=234)	.18**	.25***	.20**	—										92.08 (7.62)
5. Maternal fetal attachment	-.07	.21**	.17*	.06	—									68.87 (9.60)
6. Identification with motherhood (n=232)	-.14*	.21**	.09	.01	.52***	—								83.95 (10.44)
7. Maternal self-confidence (n=239)	.08	.31***	.26***	.05	.42***	.51***	—							21.07 (4.39)
8. Pregnancy health	.05	.34***	.26***	.11	.07	-.01	.09	—						3.99 (.82)
9. Experience of motherhood	.02	.34***	.26***	.10	.19**	.20**	.34***	.18**	—					63.37 (7.54)
10. Fertility treatment (0 = no, 1 = yes)	.28***	.11	-.01	.09	.15*	.07	.13*	.03	.06	—				—
11. Tertiary education (0 = no, 1 = yes)	.09	.12	.06	.12 <sup>†</sup>	-.02	-.07	-.18**	.21**	-.19**	-.10	—			—
12. Type of birth (n= 239) (0 = vaginal, 1 caesarean)	.22**	.01	-.07	.12	.03	.02	-.00	-.14*	-.04	.13*	-.05	—		—
13. Maternal health	.16*	.32***	.16*	.11	.10	.04	.12 <sup>†</sup>	.50***	.27***	.06	.08	-.06	—	3.56 (.89)
14. Infant health (n=237)	.06	.22**	.13*	.06	.02	.03	.05	.08	.24***	.06	-.08	.02	.12	4.69 (.67)

Note. N=240 unless otherwise indicated.

<sup>†</sup>  $p \leq .06$ . \*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

This change resulted in a significantly different model fit ( $\chi^2 = 12.519$ ,  $df = 1$ ,  $p < .001$ ) and improved fit indices:  $\chi^2 = 53.68$ ,  $df = 31$ ,  $p < .01$ ;  $\chi^2/df = 1.73$ , TLI = .94, CFI = .97, and RMSEA = .06 (90% CI [.03, .08]). All indicators were significantly related to their proposed latent construct ( $ps < .001$ ). Figure 1 shows the final measurement model with standardized factor loadings.

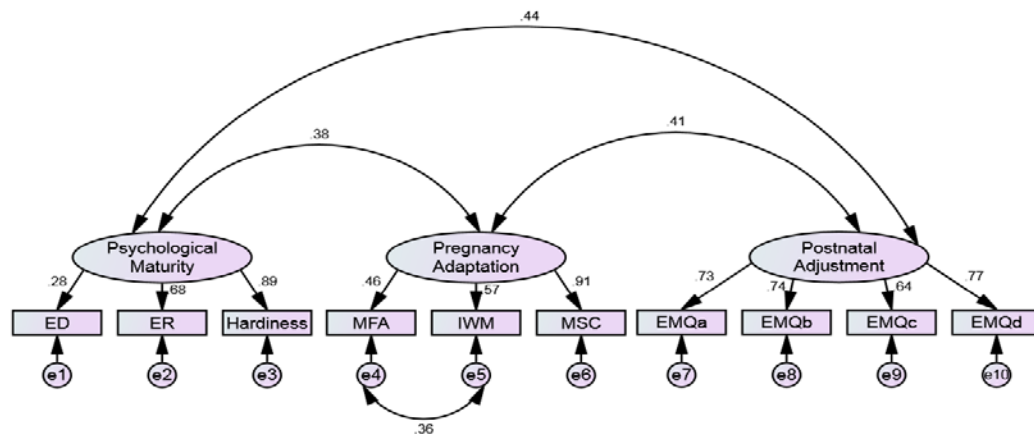


Figure 1. Measurement model showing latent constructs of psychological maturity, pregnancy adaptation and postnatal adjustment with standardised factor loadings. All indicators of latent constructs  $p < .001$ .

Note. ED = Ego Development, ER = Ego Resiliency, MFA= Maternal Fetal Attachment, IWM = Identification with Motherhood, MSC = Maternal Self-Confidence, EMQa-d = Experience of Motherhood Questionnaire item parcels

To further investigate the differential strength of the three indicators of psychological maturity in tapping the latent construct, tests of equality of factor loadings and of error variances among the three indicators, ego development, ego resiliency, and hardiness were undertaken. In initial tests, factor loadings, and then unique errors, were constrained to be equal for all three indicators. The loadings or

variances of pairs of indicators (ego resiliency and hardiness; hardiness and ego development; ego development and ego resiliency) were then constrained to be equal with the remaining indicator left unconstrained, and model fit reassessed. The chi-square difference test was significant for all overall and pairwise tests of factor loadings and error variances (all  $p$ s < .05) indicating that each scale/indicator (ego resiliency, hardiness, and ego development) tapped a significantly different aspect of psychological maturity, and that the unexplained variance was different for each indicator.

A full-measurement structural equation model was then tested to examine associations among all latent constructs (psychological maturity, pregnancy adaptation, and postnatal adjustment) together with age while controlling for education and maternal and infant health. Pregnancy health was not related to age, pregnancy adaptation, infant health, or postnatal adjustment and was removed from the model as the number of parameters estimated in the model when pregnancy health was included exceeded that recommended for a structural equation analysis for this sample size. Figure 2 shows results for the final structural model with standardized coefficients for significant paths. Although the chi-square goodness of fit index was significant ( $\chi^2 = 85.33$ ,  $df = 60$ ,  $p < .05$ ) other fit indices indicated the model was a good fit to the data:  $\chi^2/df = 1.42$ , TLI = .94, CFI = .97, and RMSEA = .04 (90% CI [.02, .06]).

Age was significantly directly associated only with psychological maturity. Psychological maturity was significantly associated with more optimal pregnancy adaptation, and predicted more optimal postnatal adjustment, as did pregnancy adaptation. Psychological maturity was associated with better postpartum maternal health and infant health. Tertiary education was associated with lower pregnancy adaptation and predicted less optimal postnatal adjustment. Maternal health and infant health were associated with better postnatal adjustment.

Bootstrapping in AMOS was used to test the indirect effect of age on pregnancy adaptation, postnatal adjustment and postnatal health. Missing data ( $n = 16$ ) were imputed using model-based Bayesian multiple imputation in order to conduct the bootstrapping analysis. Age was significantly indirectly related to both pregnancy adaptation ( $\beta = .10, p = .001$ ) and postnatal adjustment ( $\beta = .13, p < .01$ ), and to maternal health ( $\beta = .10, p = .001$ ) and infant health ( $\beta = .10, p < .01$ ), through psychological maturity. Psychological maturity was also indirectly related to postnatal adjustment through pregnancy adaptation ( $\beta = .18, p < .01$ ). To ensure data imputation did not significantly alter results, bootstrapping was also undertaken with missing data cases omitted; results were unchanged.

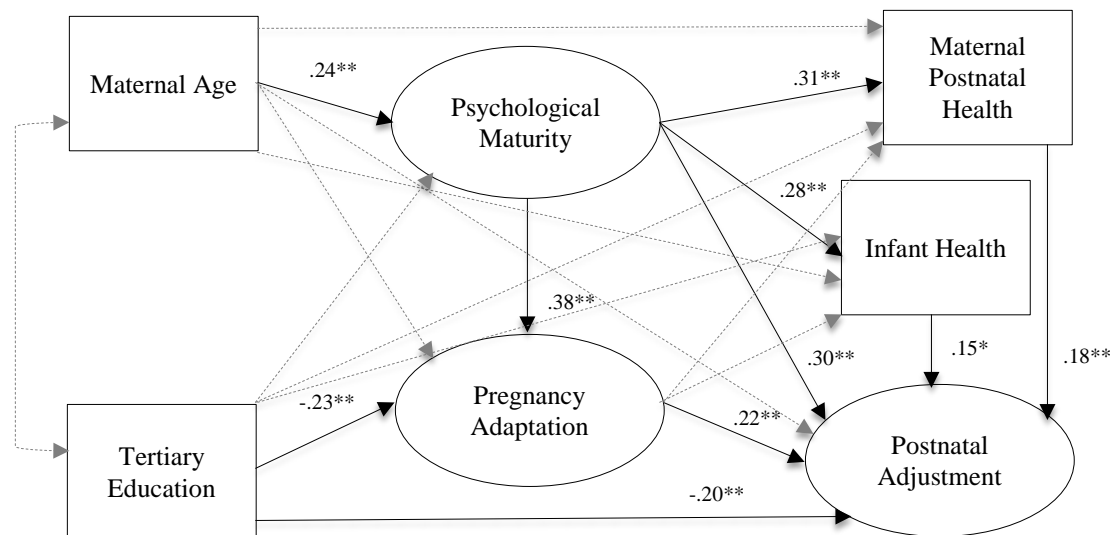


Figure 2. Structural equation model showing standardized estimates of significant paths among age, psychological maturity, pregnancy adaptation, postnatal adjustment, tertiary education, and maternal and infant health. Non-significant paths shown with dashed lines in grey. Fit indices:  $\chi^2 = 85.33$ ,  $df = 60$ ,  $p < .05$ ;  $\chi^2/df = 1.42$ ,  $TLI = .94$ ,  $CFI = .97$ , and  $RMSEA = .04$  (90% CI [.02, .06]).

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

To further examine whether age adds any substantive variance once maturity is included in the model, we constrained the direct effects of age on pregnancy adaptation,

postnatal adjustment, and health variables to zero which did not result in significant worsening of model fit,  $\chi^2 = 2.70$ ,  $df = 4$ ,  $p = .61$ . Given the potential confounding effect of maternal education via maturity on adjustment, we also constrained the direct effects of education (to zero) on pregnancy adaptation, postnatal adjustment, and health variables, which resulted in significant worsening of model fit,  $\chi^2 = 26.19$ ,  $df = 4$ ,  $p < .0001$ , suggesting education has an impact independent of maturity.

Finally, we examined whether the model applied equivalently for mode of conception groups ('fertility treatment' and 'spontaneous'). Invariance testing was undertaken in AMOS with latent factor loadings and structural paths constrained to be the same for both groups. This resulted in no significant worsening of model fit when comparing the constrained and unconstrained models,  $\chi^2 = 22.68$ ,  $df = 26$ ,  $p = .65$ , indicating similar patterns of associations across groups. The fit indices for the constrained model were:  $\chi^2 = 187.94$ ,  $df = 146$ ,  $p < .05$ ;  $\chi^2/df = 1.29$ ; TLI = .92; CFI = .94; and RMSEA = .04 (90% CI [.02, .05]).

## Discussion

The results of the current study suggest that psychological maturity associated with increasing age, rather than age per se, plays an important role in adaptation during the transition to motherhood. Results provide empirical support for the notion that older mothers are more psychologically mature, while also showing that more mature mothers adapt more favourably to pregnancy and experience better postnatal adjustment. Age contributes to adaptation in pregnancy and early motherhood but only indirectly through its link to maturity. Additionally, women who are more engaged with the developmental tasks of pregnancy experience more optimal adjustment to early motherhood. These associations apply for women who conceived using fertility treatment and those who conceived spontaneously. Findings confirm assumptions

regarding the psychological benefits that may underlie chronological age effects in parenting studies (Bornstein, et al., 2006; Ragozin, et al., 1982), and extend research by focusing on adaptation in pregnancy and the early postnatal months.

### **Psychological Maturity**

While all three indices of psychological maturity (ego development, ego resiliency, hardiness) were significant indicators of the underlying latent construct, the significant differences between factor loadings and error variances suggests that each measure involves a distinct aspect. Ego development represents a conceptually broad notion of maturity within a social-cognitive framework, compared with the more self-regulatory focus of hardiness and ego resiliency. Ego development involves an integrative cognitive process for dealing with experiences, providing a frame of reference from which each person makes sense of themselves and the world (Manners & Durkin, 2001). This notion of maturity involves a more complex way of thinking, perceiving, and organising experience. Hardiness and ego resiliency, on the other hand, belong to a class of constructs believed to tap the dynamic properties of the self-system, specifically the ability of the self to execute and integrate psychological functions to adaptively respond to potentially stressful experiences (Gramzow, Sedikides, Panter, & Insko, 2000). The ego resilient person does this by flexibly altering the degree of ego (impulse) control to enhance coping abilities, while hardiness involves cognitive appraisals that support a tolerable interpretation of potential stressors (Gramzow, et al., 2000). These differences highlight the continuing challenge of empirically conceptualising the construct of psychological maturity and the need for further research on its differing theoretical perspectives and distinct but interrelated facets, namely the capacity for self-world complexity and for adaptive self-regulation.

Age was significantly related to the latent psychological maturity construct and its individual indicators. However, the small proportion of the variance in maturity explained by age suggests that while women may become more mature as they age, other factors are clearly more important. Loevinger (1976) proposed that age is a necessary but not sufficient condition for reaching higher stages of ego development and that movement through the stages is influenced by certain kinds of environmental stimulation (Manners & Durkin, 2000). Similarly, Paris and Helson (2002) suggest that ego resiliency increases and decreases with life task successes or setbacks, while Maddi et al. (2011) view hardiness as evolving from new, often stressful or unexpected experiences which are part of the ongoing developmental process. Interestingly, there was no association between tertiary education and psychological maturity. Although higher education might be expected to facilitate cognitive development, it is probably the experience of and response to positive and negative life events that contributes to significant shifts in maturity (Manners & Durkin, 2000).

### **Adaptation during the Transition to Motherhood**

Given equivocal results from previous studies, we sought to further investigate the effect of age in relation to maternal adaptation while accounting for the influence of psychological maturity and potential age-related confounds. Age did not have direct effects on adaptation in pregnancy or postnatally, whereas psychological maturity did. Psychological maturity was also associated with better self-reported infant and maternal postpartum health. Pregnancy adaptation predicted more optimal postnatal adjustment, consistent with previous findings (Kiehl & White, 2003; Mothander, 1992). These results support Leifer's (1980) assertion that women with higher levels of personal integration are likely to make better psychological use of pregnancy, and are consistent with findings that maternal psychological adaptation to life was related to successful

copied with the demands of pregnancy and motherhood (Grossman, et al., 1980; Heinicke, et al., 1983).

Age was correlated (negatively) only with identification with motherhood in pregnancy. Given the increased risk of adverse perinatal outcome, older women may be reluctant to assume a maternal identity until after the birth of their baby, a strategy reported in a qualitative study of older mothers (Carolan, 2005). Alternatively, older women have more established lifestyles and greater investment in their occupational role (Cohen & Slade, 2000), which might also contribute to a lower identification with motherhood in pregnancy. This interpretation is suggested by 'Identification with Motherhood' scale items, for example "Being pregnant increases my sense of independence" and "Whenever I see a baby I feel like picking it up", an arguably idealised view of motherhood that may not be endorsed by women who have had a longer period to invest in life without children. The theoretical importance of identification with motherhood in pregnancy is underscored by the significant correlation between this variable and more optimal postnatal adjustment. When the developmental tasks of pregnancy were considered as the latent factor 'pregnancy adaptation', however, there was no association with age, suggesting overall comparable psychological preparation for motherhood regardless of age. However, the participant age range was 24 to 43 years and wider sampling may have yielded different results.

The conceptual differences between the three indices of maturity are again illustrated in the associations with measures of maternal adaptation. Ego development was the only index of maturity unrelated to measures of pregnancy adaptation and postnatal adjustment. Loevinger (1976) acknowledged that higher ego development is not necessarily related to adjustment or well-being, a finding confirmed in a number of empirical studies (Helson & Roberts, 1994; Helson & Wink, 1987). In contrast,



hardiness was significantly related to all adaptation variables in pregnancy and postnatally, and ego resiliency was related to all but identification with motherhood in pregnancy. These findings are novel in suggesting that the hardiness construct, which manifests as the tendency to involve oneself, to identify and find meaning, and to feel as if one is influential in the experience at hand (Kobasa, et al., 1982) may be useful in understanding adaptation to early motherhood.

In a further unique contribution we considered whether associations between age, maturity, and maternal adaptation would be equivalent for women conceiving spontaneously and those requiring fertility treatment. On individual measures, women conceiving after fertility treatment reported higher fetal attachment and maternal-self-confidence than women conceiving spontaneously, replicating previous fetal attachment findings (Fisher, et al., 2008; McMahon, et al., 2011). Researchers have cautioned that intense preoccupation with the fetus and idealised expectations of motherhood may leave women vulnerable when they experience the inevitable challenges of parenthood (Fisher, et al., 2008). However, the associations in the overall model of maternal adaptation applied irrespective of mode of conception. Given that women who require fertility treatment are generally older, the relationships in the model suggest that the adaptive advantages of greater psychological maturity may counter any perceived ‘vulnerability’ in adjusting to early motherhood.

No association between maternal age and education was evident in this sample, probably due to participants (even younger ones) being predominantly tertiary educated. Results showing lower levels of pregnancy adaptation and less optimal postnatal adjustment among tertiary educated women suggest more educated women may experience greater difficulty altering established roles to become maternally oriented in pregnancy and adjusting to the realities of early motherhood, perhaps due to a greater

focus on professional identity (Harker & Thorpe, 1992). Mercer (1986) found a consistent association between higher education and less gratification in the mothering role. Despite this, it appears that psychological maturity has a greater impact in terms of maternal adaptation than the contrary effect of tertiary education when both are considered together.

The study took into account evidence that older women may experience pregnancy and birth complications (Carolan & Frankowska, 2011), with maternal and infant health potentially impacting maternal adjustment (Mercer, 1986). Although older women in this sample were more likely to have had a caesarean birth, there was no association between age and self-reported maternal health in pregnancy or postnatally, nor between maternal age and less optimal infant health. Indeed, maternal age was indirectly related to better maternal postnatal health and infant health through psychological maturity, which predicted better health in early parenthood. More mature mothers may have mental models in pregnancy that facilitate healthy behaviors towards the fetus (Fulford, Macklon, & Boivin, 2014) and/or engage in fewer health-compromising behaviors. There is evidence that greater self-regulatory capacities may be protective (Berryman & Windridge, 1998; Dillon & Totten, 1989), which is consistent with the associations between health variables and both hardiness and ego resiliency in the current study. The health measures used were limited to maternal self-report, however, possibly capturing a perception of better health among more mature mothers. While pregnancy health was associated at a univariate level with postnatal adjustment, its contribution was not significant when other relevant variables were also included in the model. However, the significant relationship between postnatal adjustment and both postnatal maternal health and infant health (although causal

direction is speculative due to concurrent assessment of these variables) underscores the importance of considering health in future studies.

### **Strengths and limitations**

This study sought to examine the impact of older maternal age on adaptation to parenthood by specifically considering the role of psychological maturity, together with contextual and demographic factors not considered in other studies. Although the homogeneity of participants can be viewed as a limitation, the fact that participants were predominantly socio-economically advantaged, in established relationships, English speaking, and tertiary educated suggests the current findings are robust and unlikely to result from confounding demographic factors. Further, these characteristics are typical of older first-time mothers and those using assisted conception (Carolan & Frankowska, 2011; Hammarberg, et al., 2008; Schmidt, et al., 2012). Nevertheless, the generalizability of results is limited, especially in relation to younger participants, who are unlikely to be socio-demographically representative of younger mothers in the population, and mothers in non-urban areas.

Although the prospective longitudinal design allows for causal inferences in terms of the effect of psychological maturity and pregnancy adaptation on early postnatal adjustment, causal interpretations are merely speculative. Future research could investigate alternative models together with different conceptualizations of psychological maturity and less reliance on self-report measures, which may not adequately reflect the lived experience of the transition to parenthood for first-time mothers. Future longitudinal research incorporating different measures of postnatal adjustment (e.g., parenting stress), observational measures of maternal caregiving and mother-infant interaction, more objective measures of health, and qualitative perceptions, might enable a more detailed understanding. Further research is also

needed to better understand the functions and impacts of the different components of psychological maturity (in this study, self-world complexity and adaptive self-regulation) which may have differential importance according to outcome.

### **Conclusions**

The current study provides empirical support for the notion that increasing age is associated with higher levels of psychological maturity, and demonstrates that psychological maturity rather than age per se plays an important role in adaptation during the transition to motherhood. Psychological maturity is related to positive engagement with the developmental tasks of pregnancy, and both psychological maturity and pregnancy adaptation predict more optimal adjustment to early motherhood, regardless of mode of conception. Adaptation to parenthood in the early months is important for maternal emotional wellbeing and has longer-term implications for child development outcomes (Anhalt, et al., 2007). While there are valid medical concerns about delayed childbearing (Schmidt, et al., 2012), the timing of parenthood is often the result of factors outside a woman's control. Findings from the current study might reassure women that, from a psycho-social perspective, greater psychological maturity and the associated adaptive benefits it provides may be advantageous for older first-time mothers.

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## **Chapter 4:**

# **Age, Psychological Maturity and Maternal Mental Health**

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### Author Contributions

Author Anna-Lisa Camberis contributed to the methodology and conceptualisation of the present study, undertook data collection and data analyses, and wrote the first draft of the manuscript, including the revised draft for publication. Authors Catherine McMahon, Frances Gibson, and Jacky Boivin wrote the protocol for the larger prospective study from which the data in the current study was obtained and contributed to study conceptualisation, statistical analyses, and revisions of the manuscript.



### **Abstract**

In the context of the well-established trend to delay motherhood and the increased medical risks associated with motherhood at older ages, this study examines whether age-related psychological maturity is adaptive for maternal mental health during the transition to parenthood. Participants were 252 English-speaking Australian women in a prospective study of first-time motherhood (mean age 32.97 years; 43% conceived after fertility treatment) who completed measures of psychological maturity (hardiness, ego resiliency, ego development) in pregnancy, and symptom measures of anxiety, depression and emotional health in pregnancy and again at 4-6 months postpartum. Structural equation modelling showed age-related psychological maturity was directly related to more optimal mental health in pregnancy and the early months of motherhood, and indirectly through contextual factors associated with postnatal mental health, specifically maternal perceptions of an easier infant and a more supportive partner. These associations applied regardless of mode of conception (spontaneous or fertility treatment). Results suggest that psychological maturity may be a benefit of motherhood at older ages.

*Key words:* Maternal age, psychological maturity, mental health symptoms, transition to parenthood

## **Introduction**

The trend towards delayed parenthood in developed countries means increasing numbers of women are now having their first child over the age of 35 (Li, Zeki, Hilder, & Sullivan, 2013; Office of National Statistics, 2012; U.S. Census Bureau, 2012). The biological risks associated with advanced maternal age, such as declining fertility requiring medically assisted conception (Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012), higher rates of obstetric complications, and caesarean birth (Carolan & Frankowska, 2011) may contribute to greater emotional distress for older women across the transition to motherhood. Increased risks may be offset, however, by other protective factors associated with delayed motherhood, such as higher education and socioeconomic status, relationship stability (Schmidt, et al., 2012), and hypothesised psychological maturity which may contribute to positive adaptation to parenthood (Bornstein, Putnick, Suwalsky, & Gini, 2006; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). This latter proposition has rarely been systematically examined in studies of maternal age and mental health. Whether older mothers are more mature, and whether maturity, in concert with other risk and protective factors, is adaptive for mental health in pregnancy and the early months after birth is the focus of the current study.

Anxiety and depressive disorders in pregnancy and the postpartum are common and have adverse consequences for both mother and child (Clavarino et al., 2010; Murray, Cooper, & Hipwell, 2003; O'Connor, Heron, Golding, Beveridge, & Glover, 2002). Although pregnancy and the early postnatal months are a time of normative emotional challenge, subclinical symptoms of stress, anxiety, and depression have also been linked to negative outcomes such as preterm birth (Austin & Leader, 2000; Hedegaard, Henriksen, Sabroe, & Secher, 1993), greater infant negative reactivity

(Davis et al., 2004), admission to facilities for the treatment of early parenting difficulties (Fisher, Hammarberg, & Baker, 2005), as well as less optimal parenting (Belsky & Jaffee, 2006) and child development outcomes (Anhalt, Telzrow, & Brown, 2007; Zimmer-Gembeck & Thomas, 2010).

The risk factors for perinatal mood disorders are well established, with past history of psychopathology, psychological disturbance during pregnancy, poor partner relationship, lack of social support, and recent adverse life events consistently identified as the strongest predictors (O'Hara & Wisner, 2014; Schmied et al., 2013; Scottish Intercollegiate Guidelines Network, 2012). Secondary risk factors include obstetric complications and low socioeconomic status although findings are mixed (Milgrom et al., 2008; Pope, Watts, Evans, McDonald, & Henderson, 2000). Associations between maternal distressed mood and infant factors such as difficult temperament and unsettled behavior, in particular inconsolable crying (Radesky et al., 2013), have also been consistently reported (O'Hara & Wisner, 2014; Pope, et al., 2000).

The relationship between age and maternal mental health remains unclear. While it appears that younger maternal age may be a possible risk factor (Milgrom, et al., 2008; Pope, et al., 2000), this is often better explained by the socioeconomic disadvantage and family dysfunction frequently associated with younger parenthood rather than age per se (Schmied, et al., 2013). On the other hand, findings regarding older maternal age are equivocal and methodological inconsistencies make study comparisons difficult. Some studies show older women (usually aged 35 years or more) do not experience greater anxiety or depression in pregnancy or postnatally (Berryman & Windridge, 1998; Clavarino, et al., 2010; Robinson, Garner, Gare, & Crawford, 1987; Windridge & Berryman, 1999), while others report an increased vulnerability (Astbury, Brown, Lumley, & Small, 1994; Milgrom, et al., 2008).

There is speculation that the psychological maturity of older mothers may explain positive parenting outcomes reported in previous studies (Bornstein, et al., 2006; Ragozin, et al., 1982). In qualitative studies exploring the experience of older first-time motherhood, women consistently identify maturity, self-awareness and preparedness for motherhood as advantages (Carolan, 2005; Mac Dougall, Beyene, & Nachtigall, 2012), but few studies have empirically operationalised the construct of maturity in order to examine whether age is related to maturity (Belsky & Barends, 2002) or whether maturity influences the relationship between age and maternal mental health. Furthermore, parental psychological resources can impact parenting both directly and indirectly through contextual factors, such as the marital relationship and social support (Belsky, 1984). This proposition is likely to apply in respect to maternal mental health but few studies have considered whether parental psychological maturity is also associated with contextual factors relevant to postpartum mental health.

A number of contextual correlates of older first-time birth also need to be considered. Due to age-related fertility decline older mothers are more likely to require assisted reproductive technologies (ART) to conceive (Schmidt, et al., 2012). Recent reviews suggest that women conceiving through ART do not experience adverse mental health either in pregnancy or postnatally (Hammarberg, Fisher, & Wynter, 2008; Ross, McQueen, Vigod, & Dennis, 2011), although some studies have reported that ART mothers have higher rates of admission to residential services for the treatment of distressed mood and infant difficulties (Fisher, et al., 2005; Fisher, Rowe, & Hammarberg, 2012). In general these studies have not considered the effect of maternal age. The few studies that have focused on age differences report mixed findings. McMahon et al. (2007) found no differences in depression and anxiety symptoms in pregnancy comparing older (aged 38 years or older) and younger women (aged 35 years

or less) conceiving through ART, while Repokari and colleagues (2005) reported that older mothers (mean age 33 years) were more vulnerable to depression irrespective of mode of conception.

Older mothers are also more likely to experience obstetric complications and caesarean birth which may lead to poorer postnatal physical health (Berryman & Windridge, 1998; Bornstein, et al., 2006; Carolan & Frankowska, 2011; Schmidt, et al., 2012). Findings regarding the impact of these factors on postpartum mental health are equivocal (Boyce, 2003; Milgrom, et al., 2008; Pope, et al., 2000) and few studies of maternal age and mental health account for them.

In addition to a different biological context, psychosocial contextual factors may also differ for older first-time mothers. Delayed motherhood is generally associated with socioeconomic advantage which may be protective (Milgrom, et al., 2008). Whether the relationship context of older women is protective is less clear. Compared with younger women, older mothers (35 years or more) in longer relationships have reported lower levels of relationship satisfaction at the end of the first postnatal year (Windridge & Berryman, 1996), and in a sample of parents of children aged between 4 and 11 years who had been conceived through ART, older mothers (aged 38 years and over) reported less expressed warmth in the couple relationship (Boivin et al., 2009). This later finding explained higher levels of depressive symptoms in the older mothers in that study. Other studies, however, indicate that older couples used more adaptive coping strategies (e.g., humor, physical affection) in dealing with relationship problems (Bowman, 1990), and later conceiving parents have reported high marital satisfaction compared with normative population data (Garrison, Blalock, Zarski, & Merritt, 1997). Women who delay motherhood may also have more limited social support than younger mothers for a variety of reasons, including being out of synchrony with peers (Casey

Jacobs, 2000) and having older parents themselves (Bornstein, et al., 2006; Harker & Thorpe, 1992).

Having a temperamentally difficult infant can contribute to less optimal maternal mental health (O'Hara & Wisner, 2014; Pope, et al., 2000), however it is often not clear whether infant difficulties precede maternal distress or whether mothers experiencing mood symptoms perceive their infants as more difficult (McGrath, Records, & Rice, 2008; McMahon, Barnett, Kowalenko, Tennant, & Don, 2001), and disentangling cause and effect becomes more difficult when mood problems also occur in pregnancy. Research is equivocal regarding associations between maternal age and infant temperament with some studies reporting no association (Austin, Hadzi-Pavlovic, Leader, Saint, & Parker, 2005), while Bornstein and colleagues (Bornstein, et al., 2006) found older mothers reported more infant adjustment difficulties in the first month (settling, feeding, sleeping, responding) suggesting they may perceive their infant as more difficult or, alternatively, that they have more difficulty coping with normative newborn behaviors.

Given previous equivocal findings and methodological limitations, a large prospective Australian study, the Parental Age and Transition to Parenthood (PATPA) study, was designed to examine adjustment (psychological, social, and health) in pregnancy and early parenthood in older first-time mothers whilst taking into account mode of conception and other relevant contextual factors. Findings from the PATPA study to date have shown that older mothers, whether conceiving with ART or spontaneously, experienced fewer symptoms of anxiety and depression in pregnancy, had greater psychological hardiness and a more supportive partner relationship, and that hardiness and partner relationship attenuated the impact of age on pregnancy mood (McMahon, Boivin, Gibson, Hammarberg, et al., 2011).

Postnatally, neither older maternal age nor mode of conception were associated with episodes of major depression assessed by structured diagnostic interview in the first four months of motherhood (McMahon, Boivin, Gibson, Fisher, et al., 2011), but these authors noted the need to further consider subclinical indices of wellbeing and age-related protective factors.

A more in-depth investigation of a subsample of participants in the PATPA study examined psychological maturity as a protective factor for older mothers during the transition to parenthood (Camberis, McMahon, Gibson, & Boivin, in press). Older maternal age was associated with greater maturity using a latent factor with three indicators, hardiness (Kobasa, Maddi, & Kahn, 1982), ego resiliency (Block & Block, 1980), and ego development (Loevinger, 1976). Further, this latent maturity construct contributed to more optimal pregnancy adaptation (fetal attachment and maternal identity formation) and more positive experiences of early motherhood.

The current study extends this research using the same subsample and latent factor of maturity to explore whether age-related maturity is also protective with regard to symptoms of maternal mental health (anxiety, depression, and emotional health) in pregnancy and early parenthood taking account of a range of contextual variables that may be related to older maternal age. The three indicators of the latent variable of psychological maturity were chosen to encompass the adaptive flexibility, affect regulation, impulse control, and perspective taking thought to be important during the transition to parenthood (Belsky & Barends, 2002; Cohen & Slade, 2000; Heinicke, Diskin, Ramsey-Klee, & Given, 1983).

We anticipated that age-related psychological maturity would be related to more optimal mental health in pregnancy and early motherhood and, given previous equivocal age findings, hypothesized that maternal age would be indirectly positively

associated with mental health via the relationship between age and psychological maturity. Additionally, we expected that psychological maturity would be positively related to contextual factors relevant to postnatal mental health (more optimal physical health, supportive partner relationship, social support, “easy” infant temperament) and have an indirect effect on postnatal mental health through these variables. We also took account of current life events, an established predictor of mood problems, and tertiary education which has previously been identified as a protective factor. Finally, we considered whether these associations were invariant for mothers who conceived after fertility treatment and those conceiving spontaneously.

## **Method**

### **Participants**

Participants in the PATPA study were English speaking, nulliparous pregnant women aged 20 years or older recruited from ART clinics, and public and private antenatal clinics and classes in nearby hospitals in two large Australian cities (Sydney and Melbourne). Approximately equal numbers of pregnant women were recruited, both spontaneous and assisted conception, stratified across three age groups: ‘younger’, 20–30 years; ‘middle’, 31–36 years; and ‘older’,  $\geq 37$  years. Older was defined as 37 years or older, the age at which fertility decline accelerates (Gleicher, Weghofer, & Barad, 2007), and younger was below the median age of birth in Australia (31 years) at that time (Australian Bureau of Statistics, 2008). This paper reports only on women in Sydney who completed additional measures of psychological maturity.

Five hundred and nineteen eligible women in Sydney were provided with information about the PATPA study, 317 (61%) consented to participate, and 266 (84% of consenting women) completed all antenatal and postnatal measures. Due to



incomplete data, this paper reports on 252 women and their infants. The mean age of participants was 32.97 years ( $SD = 4.65$  years, range 24 – 43 years). Approximately 57% ( $n = 145$ ) conceived spontaneously, 36% ( $n = 90$ ) following ART, and 6.7% ( $n = 17$ ) had other fertility treatment (fertility drugs, ovulation induction, or intrauterine insemination) but not ART. The latter two were combined into the ‘fertility treatment’ group for analyses ( $n = 107$ , 42.5%). Eleven percent of participants ( $n = 28$ ) reported their pregnancy was not planned. As shown in Table 1, the majority of participants were in established relationships (85% married, 13% de facto/cohabiting), university educated (67%), in professional occupations (76%), and came from an English-speaking background (77%). Most babies were born at term (94%). Rates of obstetric complications (35%) and caesarean birth (44%) were high. Twelve women (5%) gave birth to twins. The infants were 133 boys and 131 girls. The majority of infants were reported as having good health (five infant were reported as having fair or poor health).

## **Procedure**

After gaining approval from relevant institutional ethics committees, consenting women participated in a structured telephone interview, and completed standardised questionnaires either online or in hard copy (returned by mail) in the third trimester of pregnancy ( $M_{\text{gestation}} = 31$  weeks,  $SD = 2$  weeks) and again between 4 – 6 months postpartum ( $M_{\text{babyage}} = 20$  weeks,  $SD = 4$  weeks).

## **Measures**

**Demographic and Reproductive History.** Participants provided information in pregnancy regarding age, mode of conception, whether the pregnancy was planned, education, marital history, employment status, and language(s) spoken at home. Postnatal information included obstetric complication, birth, and infant details.

Table 1

*Participant Demographic and Contextual Characteristics by Age Group and Mode of Conception Group*

		<b>Age Group ≤ 30 <i>n</i> = 96</b>	<b>Age Group 31-36 <i>n</i> = 83</b>	<b>Age Group ≥ 37 <i>n</i> = 73</b>	<b>Total Sample <i>N</i> = 252</b>	<b>Spontaneous Conception <i>n</i> = 145</b>	<b>Fertility Treatment <i>n</i> = 107</b>
Age (years) <sup>1,2 a</sup>	M (SD)	28.22 (1.51)	33.31 (1.70)	38.89 (1.74)	32.97 (4.65)	31.72 (4.34)	34.36 (4.54)
Tertiary education	<i>n</i> (%)	62 (61%)	71 (71%)	70 (71%)	169 (67%)	103 (71%)	66 (62%)
English-only at home	<i>n</i> (%)	71 (74%)	65 (78%)	57 (78%)	192 (77%)	113 (78%)	80 (75%)
Professional Occupation <sup>1</sup>	<i>n</i> (%)	65 (68%)	66 (80%)	60 (83%)	191 (76%)	108 (75%)	83 (78%)
Partnered	<i>n</i> (%)	96 (100%)	81 (98%)	71 (97%)	248 (98%)	142 (98%)	106 (99%)
Fertility treatment <sup>1 b</sup>	<i>n</i> (%)	28 (29%)	33 (40%)	46 (63%)	107 (43%)	—	—
Unplanned pregnancy	<i>n</i> (%)	12 (13%)	11 (13%)	5 (7%)	28 (11%)	28 (11%)	0
Obstetric complication <sup>2</sup>	<i>n</i> (%)	29 (30%)	29 (35%)	29 (40%)	87 (35%)	40 (28%)	47 (44%)
Cesarean birth <sup>1,2</sup>	<i>n</i> (%)	38 (40%)	29 (35%)	45 (63%)	112 (45%)	56 (40%)	56 (52%)
Gestation at birth (weeks) <sup>2</sup>	M (SD)	39.35 (1.65)	39.47 (1.98)	39.37 (1.78)	39.37 (1.78)	39.68 (1.70)	38.94 (1.81)

*Note.* <sup>1</sup>Age-groups differ at  $p < .05$ . <sup>2</sup>Mode of conception groups differ at  $p < .05$ .

<sup>a</sup>Age range of participants 24 – 43 years. <sup>b</sup>Due to sampling strategy proportion not representative of general population.

**Psychological Maturity.** Three measures were completed in pregnancy.

**Hardiness.** The Personal Views Survey 3<sup>rd</sup> Edition, Revised (PVS-III-R; Maddi & Khoshaba, 2001), an 18-item questionnaire, assesses psychological hardiness, a personality trait involving the ability to transform stressful experiences into opportunities for learning and personal development. Items are rated on a 4-point scale from 0 (*not true at all*) to 3 (*very true*) and form three subscales; commitment (being involved; e.g., “Trying your best at what you do usually pays off in the end”), control (being an initiator; e.g., “Most of the time, people listen carefully to what I have to say”), and challenge (continual learning; e.g., “Changes in routine provoke me to learn”). The sum of all scale items reflects overall hardiness with a higher score (range 0 – 54) indicating greater hardiness. Reliability for the total scale in the current sample was acceptable (Cronbach’s  $\alpha = .77$ ).

**Ego resiliency.** The 14-item Ego Resiliency Scale (ER89; Block & Kremen, 1996) assesses the capacity for flexible and resourceful adaptation to changing circumstances (e.g., “I enjoy dealing with new and unusual situations”). Items are rated on a 4-point scale from 1 (*does not apply at all*) to 4 (*applies very strongly*). A higher summed score indicates higher resiliency (range 14 – 56). Cronbach’s alpha reliability for the current sample was .82.

**Ego development.** The Washington University Sentence Completion Test Short Form 81 (SCT; Hy & Loevinger, 1996), a projective test requiring participants to complete 18 sentence stems (the first 18 of the full 36 were used), assesses the complexity and coherence individuals demonstrate in thinking about themselves and others. The 18-item short form has comparable validity and reliability to the 36-item form (Novy & Francis, 1992). A trained coder assigned responses an ego level rating based on Loevinger’s (1976) nine stages of ego development (from the lowest level, E2

Impulsive, to the highest and rarely attained level, E9 Integrated) with reference to the coding manual (Hy & Loevinger, 1996). A subset of protocols (25%) was scored by an independent coder, with high agreement between the two ( $\kappa = .98$ ). An Item Sum Score was calculated from the sum of all 18 items, with a higher score reflecting higher ego development (range 36 – 162). This is recommended as the most reliable scoring method for the 18-item form (Hy, Bobbitt, & Loevinger, 1998). Cronbach's alpha for the current sample was .77.

**Mental Health.** Self-report measures were completed in pregnancy and again between 4-6 months postpartum.

**Anxiety.** The 20-item State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, & Lushene, 1983) assessed current (state) and general (trait) feelings of tension, anxiety, and nervousness (e.g. state “I am worried”, trait “I worry too much over something that really doesn't matter”). Items scores range from 1 to 4, with a higher summed total score (range 20 – 80) indicating greater anxiety. Only the state score was used in the current study. The STAI has been validated for use in pregnancy (Grant, McMahon, & Austin, 2008). Cronbach's alpha for the current sample was .91 in pregnancy and .89 postnatally.

**Depression.** The 10-item Edinburgh Postnatal Depression Scale (EPDS, Cox, Holden, & Sagovsky, 1987) assesses symptoms of depression and identifies women at risk of postnatal depression, although the measure is also validated for use in pregnancy (Murray & Cox, 1990). Items scores range from 0 to 3, with a higher total summed score (range 0 – 30) reflecting greater depressive symptoms. Cronbach's alpha for the current sample was .84 in pregnancy and .82 postnatally.

**SF-12 Health Survey.** The SF-12, version 2 (Ware, Kosinski, & Keller, 1996; Ware, Kosinski, Turner-Bowker, & Gandek, 2002), a 12-item short form of the SF-36

Health Survey, assesses general health status and health related quality of life. Items assess eight domains: physical functioning, role limitation due to physical health problems, role limitation due to emotional health problems, social functioning, emotional well-being, pain, energy and/or fatigue, and general health. Using all eight domains, two summary scores are calculated by separate algorithm. The *Mental Component Summary (MCS)* provides a self-assessment of overall emotional wellbeing, whereby the emotional domains are weighed more heavily than the physical ones. The *Physical Component Summary (PCS)* assesses self-reported physical health, giving greater weight to the physical domains. Summary scores have a mean of 50 and a standard deviation of 10, with a higher score indicating more optimal subjective health.

**Partner Relationship.** The Intimate Bonds Measure (IBM, Wilhelm & Parker, 1988), a 24-item scale, assessed the perceived quality of the postnatal partner relationship on two dimensions: care (warmth, affection, e.g., “my partner is very considerate of me”), and control (restriction of freedom, criticism, e.g., “my partner is clearly hurt if I don’t accept their views”). Items are rated from 0 (very true) to 3 (not true at all) with a higher score (range 0 – 36) indicating higher perceived care (more optimal) or control (less optimal). Only the control scale was used in the current study as this dimension has been most closely linked to perinatal mood state (Fisher, Feekery, & Rowe-Murray, 2002). Cronbach’s alpha for the current sample was .83.

**Infant Temperament.** Mothers completed the Short Temperament Scale for Infants (Sanson, Prior, Garino, Oberklaid, & Sewell, 1987), responding to 30 items regarding specific infant behaviors on a 6-point scale from 1 (*almost never*) to 6 (*almost always*). Items yield five dimensions with high scores on each representing more problematic temperament. A composite score, the Easy-Difficult Scale (EDS), the calculated from the sum of three temperament dimensions, approach-withdrawal (e.g.,

“For the first few minutes in new place or situation the baby is fretful”), cooperation (e.g., “The baby continues to fret during nappy change in spite of efforts to distract”), and irritability (e.g., “The baby continues to cry in spite of several minutes of soothing”). A higher score suggests more ‘difficult’ temperament. Reliability for the EDS was acceptable ( $\alpha = .72$ ). Although 12 women gave birth to twins, only one infant temperament score was used in analyses given a high correlation between temperament ratings for the two infants ( $r = .88, p < .001$ ).

**Social Support.** Mothers rated their overall satisfaction with practical support since birth from a variety of sources (family, friends, paid help) on a five point rating scale from 1 (not at all satisfactory) to 5 (very satisfactory).

**Life Events.** A single question assessed current adverse life events: “Are there events in your life at present, quite apart from having a baby, that are worrying or distressing?” (yes/no).

### **Data Analyses**

Preliminary analyses were undertaken to identify missing data, test for normality of continuous variables and assess bivariate relationships among all study variables. Structural equation modelling using AMOS (Version 19; Arbuckle, 2010) with full information maximum likelihood estimation (Arbuckle, 1996) was used to evaluate the model. Bootstrapping in AMOS was used to examine indirect effects with missing data imputed using model-based Bayesian multiple imputation. Bootstrapping was also undertaken with missing data cases omitted to ensure imputation did not significantly alter results. To overcome the sensitivity to sample size problem inherent in the chi-squared goodness of fit index, the following fit indices and criteria of a good fit were used:  $\chi^2/df$  with a value less than 2 (Wheaton, Muthén, Alwin, & Summers, 1977), Tucker-Lewis index (TLI; Tucker & Lewis, 1973) and comparative fit index

(CFI; Bentler, 1990) with cut-off values close to .95 (Hu & Bentler, 1999), and root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) with a value close to .06 (Hu & Bentler, 1999).

Initially a measurement model containing the latent factor of psychological maturity (ego resiliency, hardiness, ego development) reported previously (Camberis, et al., in press), together with latent factors of pregnancy mental health symptoms (depression, anxiety, emotional health), and postnatal mental health symptoms (depression, anxiety, emotional health) was tested. A structural model was then evaluated to examine associations between latent variables, age and contextual factors. Lastly, a model invariance test was conducted using multigroup analysis to establish the equivalence of the relationships in the model across mode of conception groups ('fertility treatment' and 'spontaneous'). Factor loadings for the measurement model and path coefficients for the structural model were constrained to be the same across groups.

## **Results**

### **Preliminary Analyses**

Less than 5% of all questionnaire items were missing. Mean substitution was used on scales where fewer than 10% of items were missing (hardiness, ego resiliency, SF-12). On the SCT, missing sentence completions were assigned an E4 rating (the modal rating) (Hy & Loevinger, 1996) and where more than three sentence completions were missing the protocol was not rated ( $n = 8$ ). Variability in participant  $n$  in statistical analyses is due to missing data on some measures. Most variables satisfied assumptions of normality. The SF-12 mental component summary in pregnancy and postnatally, and the SF-12 postnatal physical component summary were skewed towards more favourable mental and physical health and a square root transformation

was applied. Scores were reflected before transformation so that higher scores on transformed variables indicate less favourable mental and physical health. The EPDS (depression) in pregnancy was skewed towards low depressive symptoms and a square root transformation was applied. IBM-partner control was more extremely skewed toward more favourable relationship quality (less controlling/critical partner) and a logarithmic transformation was applied. All analyses were calculated using transformed variables but untransformed means and standard deviations are reported.

### **Bivariate Relationships**

Correlations, means and standard deviations of study variables are shown in Table 2. Pearson correlations show significant inter-correlations among all three maturity variables and mental health variables in pregnancy and postnatally (depression, anxiety, emotional health). Age was significantly associated with all three maturity variables but with only one mental health variable, depressive symptoms in pregnancy (negatively). Contextual risk factors (partner support, social support, infant temperament, and life events) were all related to postnatal mental health measures. Point-biserial correlations show women who conceived after fertility treatment were significantly older than women who conceived spontaneously. Women with tertiary education reported less optimal postnatal emotional health, ratings of a more difficult infant temperament, and less satisfaction with social support. Infant age and gender were not related to any measure of postnatal mental health or contextual factor and were not considered further (data not in Table 2).

Thirty-five percent ( $n = 87$ ) of mothers reported experiencing an obstetric complication during pregnancy, with 25 women experiencing more than one complication. High blood pressure was the most common (11%), followed by gestational diabetes (8%). Obstetric complications in pregnancy were not related to age



but women conceiving after fertility treatment reported higher rates of complications than women who conceived spontaneously,  $r = .17$ ,  $p < .01$ . Caesarean birth was significantly associated with obstetric complications ( $r = .17$ ,  $p < .01$ ), older age ( $r = .21$ ,  $p < .01$ ) and assisted conception ( $r = .13$ ,  $p < .05$ ). Neither obstetric complications, nor caesarean birth were related to postnatal physical health or postnatal mental health outcomes and were not considered further (data not in Table 2).

Thirty-five percent ( $n = 89$ ) of participants reported a recent life event causing worry or distress, with 19 women describing more than one event. Finances and work issues were the most common, followed by family and relationship issues. The proportion of women reporting a life event did not differ by age or mode of conception group. Recent life events were associated with all three postnatal mental health measures (data in Table 2).

### **Model Testing**

The measurement model, with latent variables of ‘psychological maturity’ (ego resiliency, hardiness, ego development), ‘pregnancy mental health symptoms’ and ‘postnatal mental health symptoms’ with three indicators each (depression, anxiety, and emotional health), yielded poor fit statistics,  $\chi^2 = 68.64$ ,  $df = 24$ ,  $p < .001$ ;  $\chi^2/df = 2.86$ , TLI = .92, CFI = .96, and RMSEA = .09 (90% CI [.06, .11]). Modification indices suggested covariance between the residuals of the three observed variables of mental health symptoms across measurement times (pregnancy and postnatally) would achieve a better model fit. The residual variability of the three symptom measures unexplained by the factor is likely to be common on both occasions. The residuals were allowed to covary and model fit reassessed. This resulted in a significantly different model fit ( $p < .001$ ) and improvement in fit indices as follows:  $\chi^2 = 23.65$ ,  $df = 21$ ,  $p = .31$ ;  $\chi^2/df = 1.13$ , TLI = .99, CFI = 1.00 and RMSEA = .02 (90% CI [.00, .06]).

Table 2. *Correlation Matrix and Means (M) and Standard Deviations (SD) of Study Variables.*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age in years	–															
2. Hardiness	.21**	–														
3. Ego resiliency	.17**	.58***	–													
4. Ego development <i>n</i> =244	.18**	.25***	.18**	–												
5. EPDS antenatal depression	-.13*	-.31***	-.18**	-.09	–											
6. STAI antenatal anxiety <i>n</i> =251	-.09	-.35***	-.26***	-.11	.67***	–										
7. SF12 antenatal emotional health <sup>R</sup>	-.08	-.28***	-.20**	.00	.64***	.60***	–									
8. EPDS postnatal depression	-.09	-.24***	-.16*	-.07	.46**	.38**	.37***	–								
9. STAI postnatal anxiety	-.03	-.39***	-.29***	-.09	.39***	.51***	.35***	.70***	–							
10. SF12 postnatal emotional health <sup>R</sup>	-.07	-.24***	-.15*	-.05	.32***	.32***	.35***	.71***	.63***	–						
11. SF12 physical health <sup>R</sup>	-.01	-.21***	-.13*	.07	.04	.08	-.02	-.11	.07	-.29***	–					
12. IBM partner control <i>n</i> =250	-.02	-.19**	-.07	-.03	.09	.07	.10	.16*	.20*	.18*	.07	–				
13. Infant temperament	-.03	-.38***	-.28***	-.09	.22***	.20**	.22**	.21**	.30***	.39***	-.02	.14*	–			
14. Social support	-.04	.10	.09	-.07	-.14*	-.24***	-.10	-.10	-.25***	-.19**	-.03	-.10	-.03	–		
15. Fertility treatment, 0=no, 1=yes	.31***	.11	.10	.10	-.07	-.08	-.04	-.07	.00	-.12 <sup>†</sup>	.09	-.06	-.12 <sup>†</sup>	-.02	–	
16. Tertiary education, 0=no, 1=yes	.07	.12 <sup>†</sup>	.04	.12 <sup>†</sup>	.05	.02	.07	.06	.06	.17*	-.06	.17	.13*	-.13*	-.10	–
17. Life events, 0=no, 1=yes	.07	-.06	.02	.05	.10	.16*	.10	.27***	.31***	.30***	.07	.07	-.02	-.07	-.00	.05
M <sup>a</sup> (SD)	32.97 (4.65)	39.89 (5.42)	41.33 (6.13)	92.18 (7.51)	5.34 (4.35)	31.92 (8.71)	53.14 (8.19)	4.46 (3.67)	29.85 (7.47)	50.20 (7.99)	52.21 (6.17)	4.53 (4.73)	2.41 (0.52)	4.05 (1.00)	–	–

Note. *N* = 252 unless otherwise indicated. <sup>R</sup>Scores reflected for transformation, higher scores indicate poorer health. <sup>a</sup>Untransformed *M* and *SD* reported.

<sup>†</sup>*p* < .06. \* *p* < .05. \*\**p* < .01. \*\*\**p* < .001.

Figure 1 shows the measurement model with standardised factor loadings. All indicators in the measurement model were significant predictors of their proposed latent construct (all  $ps < .001$ ).

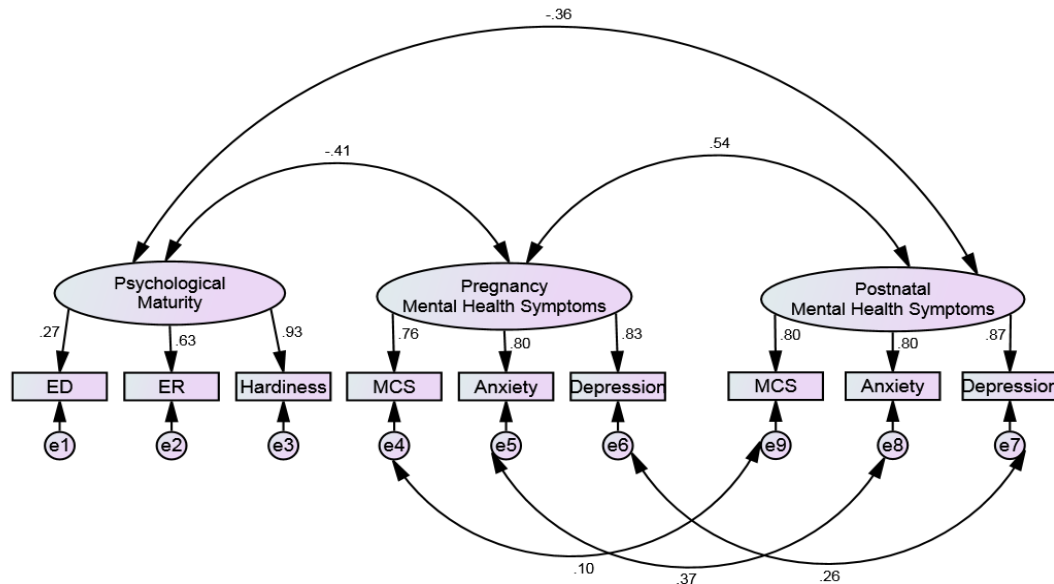


Figure 1. Measurement model with latent constructs and standardised factor loadings. All indicators of, and correlations between, latent constructs  $p < .001$ .

Note. ED = Ego Development, ER = Ego Resiliency, MCS = SF-12 Mental Component Summary reflected (higher scores less optimal).

A full-measurement structural equation model then examined associations among study variables. The initial model contained direct paths between anticipated risk factors (pregnancy mental health symptoms, partner relationship, social support, infant temperament, physical health, and life events) and postnatal mental health symptoms. Age, psychological maturity, and education each predicted pregnancy and

postnatal mental health symptoms and all anticipated risk factors, except life events. Direct paths between age and maturity, and education and maturity were included. Although the  $\chi^2$  value was significant ( $\chi^2 = 139.42$ ,  $df = 82$ ,  $p < .0001$ ), other fit indices suggested the model was an adequate fit to the data:  $\chi^2/df = 1.70$ , TLI = .91, CFI = .95 and RMSEA = .05 (90% CI [.04, .07]), acknowledging the TLI was somewhat low. This model contained a large number of non-significant paths. Age was not significantly related to any variable except maturity, and education was only significantly related to partner relationship, social support, and infant temperament. Social support was not significantly associated with postnatal mental health symptoms.

As the number of parameters that could validly be assessed in the model was limited by sample size, all non-significant paths were deleted and model fit was re-evaluated. The model now included a direct path between age and maturity only, and paths between maturity and mental health symptoms in pregnancy and postnatally, and between maturity and all contextual factors (partner relationship, infant temperament, physical health) except life events. Pregnancy mental health symptoms, life events, partner relationship, infant temperament and physical health predicted postnatal mental health symptoms, and direct paths between education and relationship quality and infant temperament remained. Fit indices for this model remained satisfactory with an improvement in TLI:  $\chi^2 = 122.45$ ,  $df = 79$ ,  $p = .001$ ;  $\chi^2/df = 1.56$ , TLI = .94, CFI = .96 and RMSEA = .05 (90% CI [.03, .06]).

Figure 2 shows results for the final structural model with standardised coefficients. The  $R^2$  estimate indicated that the model explained 43% of the variance in postnatal mental health.

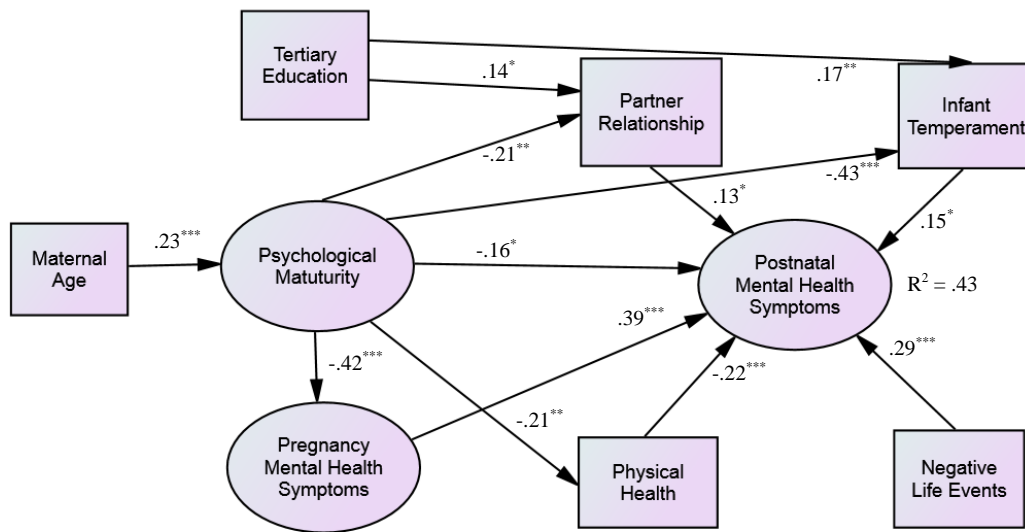


Figure 2. Structural model showing standardised estimates of paths. Fit indices:  $\chi^2 = 122.45$ ,  $df = 79$ ,  $p = .001$ ;  $\chi^2/df = 1.55$ ,  $TLI = .94$ ,  $CFI = .96$  and  $RMSEA = .05$  (90% CI [.03, .06]).

*Note.* Higher scores on partner relationship, infant temperament, and physical health are less optimal.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

The final model indicated that age was significantly positively associated with psychological maturity, which in turn was significantly associated with fewer mental health symptoms in pregnancy and postnatally. Higher pregnancy mental health symptoms predicted higher postnatal mental health symptoms. Psychological maturity was also related to contextual factors associated with postnatal mental health symptoms, namely reports of better physical health, a less difficult infant temperament and a less controlling/critical partner. Recent life events, ratings of a more controlling partner and more difficult infant were associated with higher postnatal mental health symptoms, while poorer physical health was associated with fewer mental health symptoms. Tertiary education predicted reports of a more difficult infant and a more controlling/critical partner.

Bootstrapping analyses showed older age was indirectly associated, through maturity, with less mental health symptoms (more optimal) both in pregnancy ( $\beta = -.10$ ,  $p < .01$ ) and postnatally ( $\beta = -.09$ ,  $p < .01$ ), better postnatal physical health ( $\beta = -.05$ ,  $p < .01$ ), reports of a less difficult infant temperament ( $\beta = -.10$ ,  $p < .01$ ) and less controlling/critical partner ( $\beta = -.05$ ,  $p < .01$ ). Psychological maturity was also significantly indirectly related to fewer postnatal mental health symptoms ( $\beta = -.21$ ,  $p < .01$ ). Tertiary education was indirectly related to higher postnatal mental health symptoms ( $\beta = .04$ ,  $p < .01$ ).

Invariance testing with latent factor loadings and structural paths constrained to be the same across mode of conception groups ('fertility treatment' and 'spontaneous') resulted in no significant worsening of model fit when comparing the constrained model with the unconstrained one,  $\chi^2 = 19.26$ ,  $df = 19$ ,  $p = .44$ . The fit indices for the constrained model were as follows:  $\chi^2 = 252.95$ ,  $df = 177$ ,  $p < .001$ ;  $\chi^2/df = 1.43$ , TLI = .91, CFI = .93, and RMSEA = .04 (90% CI [.03, .05]).

## Discussion

This study considered the emotional well-being of older first-time mothers by examining self-reported symptoms of mental health in pregnancy and the early postpartum. Results suggest that psychological maturity associated with older maternal age was related to more optimal mental health (fewer mental health symptoms) both in pregnancy and the early months of parenthood, extending earlier findings regarding the advantages of age-related maturity for mood in pregnancy (McMahon, Boivin, Gibson, Hammarberg, et al., 2011) to the early months of motherhood. Psychological maturity also appears protective in terms of contextual factors that are associated with more optimal postnatal mental health, specifically perceptions of a more supportive partner and a less difficult infant. Older maternal age is associated with more favourable mental health and contextual factors, but only indirectly via psychological maturity. These associations apply both for women conceiving spontaneously and those conceiving after fertility treatment.

The current finding that maternal age was not directly related to mental health in pregnancy nor in the early postnatal months provides further evidence that older first-time mothers are not at increased risk of distressed mood across the transition to parenthood (Berryman & Windridge, 1998; Pope, et al., 2000). Results in this study regarding the indirect benefits of older age via maturity suggest that previous positive findings related to older maternal age may also reflect underlying variables not systematically examined in those studies. Participant age range (24 - 43 years) may have contributed to null findings, however, as younger maternal age has more frequently been identified as a risk factor for less optimal mental health (Clavarino, et al., 2010; Milgrom, et al., 2008; Pope, et al., 2000; Schmied, et al., 2013), and the current study did not include teenage mothers. Further, the younger mothers in the

current study were of a relatively high socio-economic status and vulnerability for younger mothers has been attributed to more adverse socio-economic circumstances (Schmied, et al., 2013).

Additionally, findings suggest that the social context of early parenthood considered in this study is comparable for older and younger mothers, at least in this socioeconomically advantaged sample. Although older mothers were more likely to require assistance to conceive and to have had a caesarean birth, there were no significant differences in terms of perceptions of physical health, or ratings of partner relationship and infant temperament, contrary to some previous findings (e.g., Bornstein, et al., 2006; Windridge & Berryman, 1996). Again, the indirect effects of age through maturity suggest older age may provide some benefit in terms of contextual factors associated with more optimal mental health.

Importantly, results support the hypothesised adaptive benefits of age-related psychological maturity for mental health during the transition to parenthood. Parenting models (Belsky, 1984; Heinicke, 2002) propose that parental psychological resources are the most influential determinant of parenting because they are likely to contribute to the context of parenting as well as to parenting directly. The model tested here suggests that psychological maturity impacts maternal mental health both directly and indirectly through contextual factors associated with better maternal mental health, specifically less symptoms of distress in pregnancy, and postnatal perceptions of a supportive partner and more normative infant characteristics. Heinicke (2002) proposed that the parent who is capable of non-anxious flexible adaptation and the ability to develop and sustain a positive partner relationship is more likely to provide a more optimal parenting environment. Women who are more psychologically mature may not only view their partner as more supportive, but may be more likely to select a partner with



whom they have a warm and open relationship (Belsky, 1984; Gonzaga, Carter, & Galen Buckwalter, 2010; Klohnen, Vandewater, & Young, 1996).

Previous studies have identified that less adaptive personality characteristics, such as perfectionism, neuroticism, interpersonal sensitivity, immature defences, and irrational cognitions render women vulnerable to postnatal stress and depression (Boyce, et al., 1991; Milgrom & Beatrice, 2003; Milgrom, et al., 2008; Willcocks & McMahon, 2006). Associations between individual indices of maturity and the outcomes considered in the current research suggest that the self-regulatory constructs of hardiness and ego resiliency account for the effects of psychological maturity on mental health outcomes. Thus, women who are able to regulate negative affect, adapt flexibly, appraise stressors as challenging, and effectively utilise available supports feel less emotionally overwhelmed by the challenges of new parenthood. Internal resources such as these are thought to protect against psychological distress directly and indirectly through cognitive appraisals that allow a more realistic and less emotionally overwhelming interpretation of stressful situations, as well as through the use of external supports that are thought to mediate some of the stress during important life transitions (Lang, Goulet, & Amsel, 2004). This proposal appears consistent with current findings.

These results have implications in terms of possible interventions in pregnancy or the early postnatal period for women who may be at risk of adjustment difficulties. Interventions that focus on strengthening adaptation competence, cognitive flexibility, and the use of versatile coping strategies may help to reduce any negative affect associated with the demands of a new infant, changes in routine and relationships, and occupational and social losses (Pope, et al., 2000). Hardiness has been shown to be responsive to a training procedure (Maddi, Khoshaba, Harvey, Fazel, & Resurreccion,

2011), and cognitive behavioural interventions relevant to the parenting context may also help develop adaptive internal resources to facilitate more optimal mental health.

In a novel contribution, the associations in the model were examined to ascertain whether they applied equally for women conceiving after fertility treatment and those conceiving spontaneously. Results contribute to a body of evidence suggesting that the experience of infertility and medically assisted conception does not lead to elevated symptoms of distress in the third trimester of pregnancy nor during adjustment to the early months of motherhood. It may be that women conceiving with ART experience greater distress earlier in pregnancy than spontaneously conceiving women, which has dissipated as the pregnancy progresses towards a likely positive conclusion (Hammarberg, et al., 2008; Hjelmstedt, Widström, Wramsby, Matthiesen, & Collins, 2003). The fact that women using fertility treatment are generally significantly older and, in this study, more likely to experience obstetric complications and caesarean birth, suggests however, that age-related maturity may prove adaptive during the emotionally-fraught assisted conception process and in countering any emotional distress regarding pregnancy outcome and the stresses of early parenthood.

Other findings were largely consistent with established risk factors for postnatal mood disorders, with mental health symptoms in pregnancy the strongest predictor of postpartum mental health, and maternal perceptions of a controlling/critical partner and a difficult infant also significantly related to less optimal postnatal mental health (Scottish Intercollegiate Guidelines Network, 2012). The concurrent association with difficult infant temperament does not exclude the interpretation that psychologically distressed mothers may perceive typical infant behaviour as difficult, and the reciprocal nature of relationships between infant temperament difficulty and maternal mood is well established (Papousek & von Hofacker, 1998). Significant associations among all

three measures of mental health in pregnancy and later reports of a more difficult infant suggest, however, that while concurrent maternal mental health may play a role in perceptions, prenatal mental health may impact the developing infant's regulatory system in utero. Some studies have shown a link between maternal anxiety (trait and state) and/or depression in pregnancy and later infant negative reactivity (Austin, et al., 2005; Davis, et al., 2004; McMahon et al., 2013) suggesting both a possible genetic effect and a fetal programming mechanism. Future prospective studies of maternal mental health using objective observational assessments of infant temperament may provide further clarification.

Contrary to expectations, however, there were no associations among postnatal mental health symptoms and education and social support. Although greater satisfaction with social support was associated with fewer symptoms on individual measures of anxiety and emotional distress in the early postnatal months, social support was not related to the latent factor of postnatal mental health when other contextual factors were also included in the model. It appears that social support was not as important a contributor to postnatal mental health as partner relationship, infant temperament, and concurrent negative life events in this predominantly socioeconomically advantaged sample. Intriguingly, higher education, considered a possible protective factor against maternal anxiety and depression (Clavarino, et al., 2010; Milgrom, et al., 2008), was indirectly associated with poorer postpartum mental health. Again, sample characteristics need to be considered in interpreting this finding. The majority of participants, both younger and older, were tertiary educated, and results may have differed in a more diverse sample. Mothers with tertiary education were also less satisfied with support, perceived their infant as more difficult and their partner as less supportive. Previously, mothers with tertiary education have reported less

gratification with mothering (Mercer, 1986), with Pridham and colleagues (Pridham, Lytton, Chang, & Rutledge, 1991) proposing that higher education may result in a more accurate assessment of the realities of early parenthood. A prior focus on largely controllable outcomes such as educational and career attainments may also contribute to unrealistic expectations regarding socializing the baby to fit in around parental lives (Carolan, 2005) and negative perceptions regarding what might seem like largely uncontrollable challenges of infant behaviour. Women with tertiary education may also have expectations regarding less gendered family roles but also tertiary educated husbands employed in occupations requiring longer work hours (Fisher, et al., 2002). The birth of a child greatly changes the division of household labour and inequity becomes greater (Koivune, Rathaupt, & Wolfgram, 2009), and this may contribute to feelings of relationship dissatisfaction.

The finding that women who reported poorer postnatal physical health experienced fewer symptoms of emotional distress was also counter-intuitive, despite previous mixed findings regarding any association between physical health and maternal mental health (Boyce, 2003; Brown & Lumley, 2000; Milgrom, et al., 2008). Socially desirable responding and the stigma associated with mental health problems, especially for new mothers (Highet, Gemmill, & Milgrom, 2011; McCarthy & McMahon, 2008) may explain this finding to some extent. Women may be more willing to report physical health difficulties, which might be considered more normative at this time. Interestingly, although older women were more likely to have had a caesarean birth, and despite perceptions of older mothers as more likely to experience physical health problems, older age was indirectly related to better physical health via maturity, suggesting a link between self-regulatory abilities and physical health (Dillon & Totten, 1989; Kobasa, et al., 1982). It may also be that more mature women adopt

more protective health practices (e.g., non-smoking, exercise, self-care) recognising the importance of health for conception, fetal development, and birth (Carolan, 2005).

### **Strengths and Limitations**

The largely homogenous sample of socioeconomically advantaged first-time mothers limits the generalizability of results. However, the sample was broadly representative of mothers who delay parenthood and those using ART conception (Hammarberg, et al., 2008; Schmidt, et al., 2012), and findings are likely to be robust and less affected by confounding socio-demographic characteristics. The younger participants in the study are unlikely to be representative of younger first-time mothers in the general community, however, and the generalizability of findings to first-time mothers in non-urban locations and from non-English speaking backgrounds is also limited.

A second important consideration is the question of whether the indices of maturity used in the study were themselves measures of emotional health. Ego development has been found to be unrelated to well-being or adjustment (Helson & Roberts, 1994; Loevinger, 1976; McCrae & Costa, 1983). Ego-resiliency, however, has been described as a measure of psychological health reflecting both high positive and low negative emotionality (Klohn, 1996). Similarly, Funk (1992) suggested that hardiness inadvertently measures neuroticism with an absence of neuroticism seen as adjustment. Both ego resiliency and hardiness are broad self-regulatory constructs involving a number of domains of adaptive functioning, and are regarded as fairly stable personality resources rather than reflective of emotional symptoms or their absence. The latest revision of the hardiness scale shows that hardiness is empirically distinct from negative affectivity or neuroticism and unrelated to socially desirable responding (Maddi, et al., 2011). In a conceptual analysis of ego resiliency, Klohn

(1996) concluded that ego resiliency combines a number of distinct personality attributes, one of which is psychological well-being, enabling flexibility and adaptive responding to environmental contingencies. The small to moderate associations between these constructs and the measures of mental health used in the current study indicate that, although related to symptoms of emotional distress, they are clearly distinct.

The use of a range of symptom measures of mental health in both pregnancy and the postpartum was an advantage of the study. Depression has frequently been the focus of maternal mental health to the exclusion of anxiety (Schmied, et al., 2013), and the use of the SF-12 mental component summary, which also assesses the impact of emotional health on role and social functioning, enabled the broader emotional experience of women in pregnancy and the early postpartum months to be adequately captured. Although a reliance on self-report measures may affect reliability, participants were volunteers, measures were completed as part of a larger battery, and results largely in line with expectations suggest that social desirability did not significantly impact findings. The current study was not concerned with clinical diagnosis but future studies using objective measures of both mental health and infant temperament, and alternate measures of maturity, may further elucidate the relations among age, maturity, and maternal mental health during first-time parenthood.

### **Conclusion**

Current findings suggest that older maternal age at first birth is not associated with greater emotional distress during the transition to parenthood, regardless of mode of conception, and older age may in fact provide some benefit due to age-related psychological maturity. Maturity is adaptive for mental health, both directly and indirectly through a more positive context for early parenthood. Maternal mental

health, both in pregnancy and postnatally, has implications for parenting (Belsky & Jaffee, 2006) and longer-term child development outcomes (Anhalt, et al., 2007; Zimmer-Gembeck & Thomas, 2010). Increasing numbers of women are delaying motherhood until later in the reproductive lifecycle and the biological and medical risks associated with this trend are valid concerns (Schmidt, et al., 2012). Current findings, however, might reassure women that psychological maturity may be advantageous for older first-time mothers.

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## **Chapter 5:**

# **Maternal Age, Psychological Maturity, Parenting Cognitions, and Mother-Infant Interaction**

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### Author Contributions

Author Anna-Lisa Camberis contributed to the methodology and conceptualisation of the present study, undertook data collection and data analyses, and wrote the first draft of the manuscript, including the revised draft for publication. Authors Catherine McMahon, Frances Gibson, and Jacky Boivin contributed to study conceptualisation, statistical analyses, and revisions of the manuscript.

**Abstract**

In the context of the trend toward delayed childbearing, the aim of the present study was to examine the relations among maternal age and the quality of maternal interactive behaviour at 7-months assessed using sensitivity and mind-mindedness, while also considering whether any age effects were attributable to psychological maturity and parenting cognitions. Participants were 143 Australian mothers (mean age 33 years) and their first-born infants who were participating in a prospective study of parenthood. Path analysis showed maternal age had both direct and indirect associations with maternal interactive behaviour. Older mothers made more mind-related comments to their infants. They were also more sensitive however this effect was indirect and explained by greater psychological maturity (hardiness) and a more internal locus of control with regards to parenting. Results suggest that older maternal age may confer some benefits in terms of responsive parenting in infancy.

*Key words:* maternal age, hardiness, parental locus of control, sensitivity, mind-mindedness

## **Introduction**

Census data confirm increasing numbers of women in developed countries are having first births after the age of 35 (Li, Zeki, Hilder, & Sullivan, 2013; Office of National Statistics, 2012; U.S. Census Bureau, 2012). Although the biological and medical risks of childbearing for ‘older’ women, usually defined as age 35 and above, are well recognised (Carolan & Frankowska, 2011; Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012), largely unsubstantiated negative views regarding the parenting capacity of older mothers are also common (Pennings, 2013; Shaw & Giles, 2009). Empirical findings suggest that older motherhood may confer some benefits in terms of less mother-child conflict in the preschool years (Barnes, Gardiner, Sutcliffe, & Melhuish, 2013), improved child health and development up to the age of five (Sutcliffe, Barnes, Belsky, Gardiner, & Melhuish, 2012) and children’s cognitive and educational achievement at age 18 (Fergusson & Woodward, 1999), but there is limited empirical evidence about parenting quality related to older maternal age and the psychological correlates linking age and outcomes (Fergusson & Woodward, 1999; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). The aim of the present study was to examine a model of relations among maternal chronological age and two aspects of mother-infant interaction at 7-months (sensitivity and mind-mindedness) while considering whether age effects are attributable to psychological maturity and parenting cognitions.

## **Age and Parenting**

The association between maternal age and parenting practices is well established in studies that predominantly compare teenage mothers with ‘adult’ mothers (McFadden & Tamis-Lemonda, 2013). In general, findings indicate that parenthood at young ages is associated with less optimal parenting. Studies report, for example, that



teenage mothers show fewer positive (less responsive, supportive, sensitive, and verbal) and more negative (detached, intrusive) interactive behaviours than their adult counterparts (Berlin, Brady-Smith, & Brooks-Gunn, 2002; Culp, Osofsky, & O'Brien, 1996; McFadden & Tamis-Lemonda, 2013).

Much less is known about the quality of parenting in older mothers. A small number of studies to date suggest that older maternal age may be associated with more responsive and sensitive parenting (Broom, 1994; Ragozin, et al., 1982; Schlomer & Belsky, 2012). Bornstein and colleagues (Bornstein & Putnick, 2007; Bornstein, et al., 2006) have demonstrated that relations between maternal age at first birth and parenting practices vary across the spectrum of maternal age. A non-linear age effect was observed in regards to maternal sensitivity and structuring during interactions between first-time mothers and their 5-month old infants, with maternal age conferring a direct benefit in terms of parenting up to the age of 30 but not beyond this age (Bornstein, et al., 2006). The researchers note that the 'maternal maturity hypothesis' (Hofferth, 1987) proposes that older mothers are more likely to benefit from greater psychological preparedness, life experience, and greater resources. However, the apparent attenuation in any age-related parenting benefits from age 30 may be due to the fact that personality traits, sense of identity and cognitive functions mature at around this age.

The proposed benefits of psychological maturity for parenting are consistent with the parenting models of Belsky (1984) and Heinicke (1984) who suggest that while parenting is determined by multiple sources, parental attributes or psychological resources are particularly important. Psychological maturity is believed to confer a capacity for care that is supportive, sensitive, responsive, and stimulating. Age is often conflated with maturity due to beliefs that maturity increases with age (Belsky, 1984; Bornstein & Putnick, 2007). In qualitative studies mothers aged over 35 have reported

a psychological readiness for motherhood related to personal growth, emotional stability and maturity (Carolan, 2005; Mac Dougall, Beyene, & Nachtigall, 2012). However, few empirical studies have explicitly examined whether a parent's age may be related to psychological maturity when evaluating the effect of either age or parental attributes on parenting (Belsky & Barends, 2002). This is one objective of the current study.

### **Psychological Maturity**

One contributing factor to the dearth of empirical research may be the challenge of operationalising the construct of psychological maturity. Previous approaches in studies examining psychological maturity and parenting have included measures of ego development, ego resiliency, clinical interviews tapping multiple facets of psychological makeup such as ego strength, life adaptation, or psychological integration, and composites of multiple measures (Belsky & Barends, 2002). These constructs have been found, in the main, to predict quality of parental interactive behaviour in infancy and early childhood (Feldman & Nash, 1986; Heinicke, 1984; van Bakel & Riksen-Walraven, 2002).

A previous report (Camberis, McMahon, Gibson, & Boivin, in press) with a larger sample from which participants in the present study were drawn, showed that older maternal age was associated with a latent construct of psychological maturity with three indicators, hardiness (Kobasa, Maddi, & Kahn, 1982), ego resiliency (Block & Block, 1980), and ego development (Loevinger, 1976), and that psychological maturity contributed to reports of more optimal adjustment in pregnancy and the early months of motherhood. Results suggested that maturity may be viewed as a two-dimensional construct encompassing adaptive self-regulation (hardiness and ego resiliency) and social-cognitive maturity (ego development), but that the self-regulatory dimension

accounted for the effects of maturity on adjustment. Ego development was not associated with any adjustment outcome, ego resiliency was related to most, hardiness, however, was related to all measures of adjustment in pregnancy and the early postnatal months. These findings were novel in suggesting that hardiness, which manifests as the tendency to involve oneself, to identify and find meaning, and to feel as if one is influential in the experience at hand (Kobasa, et al., 1982) appears important for adaptation to early motherhood. The present study seeks to extend this work by examining whether hardiness also contributes to parenting in infancy and whether this provides any benefits for motherhood at older ages.

Hardiness (Kobasa, et al., 1982), a personality style characterised by flexibility, adaptation, and a sense of internal control in the face of changing environments is conceptually similar to parental attributes identified as important determinants of parenting in earlier research, namely the ability to efficiently, calmly, and flexibly approach problem solving (Heinicke, 1984) and the capacity to regulate emotions and take the perspective of others (Belsky, 1984). While hardiness is viewed as a relatively stable personality characteristics resulting from early familial experience (Khoshaba & Maddi, 1999), a capacity for change is acknowledged in response to repeated experiences of turning adversity into opportunity as part of the ongoing developmental process (Maddi, 2002; Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011).

There is some evidence that older mothers may be more hardy (Camberis, et al., in press; McMahon et al., 2011; McMahon, Gibson, Allen, & Saunders, 2007) and that hardiness may be associated with more adaptive parenting cognitions and bedtime interactions, contributing to fewer toddler sleep problems (Johnson & McMahon, 2008). The current study seeks to extend previous research by examining relations

among maternal age, hardiness and parenting using observational rather than self-report measures to assess parenting quality in infancy.

### **Parenting Cognitions**

Theoretically, hardiness is thought to enable adaptation to changing environments primarily through cognitive appraisals (Funk, 1992; Gramzow, Sedikides, Panter, & Insko, 2000; Maddi, 2002). As cognitions and beliefs about parenting are important determinants of parenting behaviour (Bornstein & Putnick, 2007; Hubbs-Tait et al., 2006; Sameroff & Feil, 1985; Teti, O'Connell, & Reiner, 1996), parenting cognitions may be one pathway through which hardiness may influence parenting quality. Hardiness is comprised of three interrelated components: control, commitment and challenge (Kobasa, et al., 1982). The control component concerns beliefs that one has a definite influence (Maddi, 2002), similar to concepts of self-efficacy (Bandura, 1977) and internal locus of control (Rotter, 1966), both previously associated with sensitive and responsive parenting (Bornstein et al., 2003; Bornstein, Hendricks, Haynes, & Painter, 2007; Donovan, Taylor, & Leavitt, 2007). An external locus of control, on the other hand, has been associated with more authoritarian parenting (Bugental & Johnston, 2000). Within the more specific construct of parental locus of control (Campis, Lyman, & Prentice-Dunn, 1986), parents with a more external locus of control have low parental self-efficacy, a sense that they are dominated by child demands, and believe they have little impact on the parent-child relationship and child development and behaviour (Campis, et al., 1986).

Researchers have suggested that perception of control with respect to parenting could stem from parental personality (Hagekull, Bohlin, & Hammarberg, 2001) but this has not been empirically confirmed to our knowledge. However, previous studies have reported associations between parental personality and parental self-efficacy (Bornstein,

Hahn, & Haynes, 2011; Bornstein, et al., 2003), and parental efficacy was found to mediate the relationship between parental personality traits and parenting behaviours (de Haan, Prinzie, & Dekovic, 2009). Freed and Tompson (2011) examined correlates of parental locus of control in mothers aged 29 to 55 years with children aged 8 to 14 years and found older maternal age was associated with lower feelings of parenting control, while education contributed to greater parenting efficacy. These findings contradict the generally held view that older mothers are likely to be better educated and possess greater maturity, which may engender beliefs of having greater influence and control with respect to parenting (Bornstein & Putnick, 2007; Freed & Tompson, 2011). Whether older mothers are more psychologically mature, and whether this adaptive self-regulatory dimension of maturity influences cognitions regarding parenting control and the quality of interactions between mothers and their infants is the focus of the current study.

### **Mother-Infant Interaction**

Sensitive parenting is believed to be important for the development of a secure attachment relationship (De Wolff & van Ijzendoorn, 1997) and influences many aspects of socio-emotional and cognitive development during infancy and childhood (Bernier, Jarry-Boileau, Tarabulsky, & Miljkovitch, 2010; Bornstein, Hahn, Suwalsky, & Haynes, 2011). A sensitive caregiver is able to see the infant's point of view, perceive and accurately interpret their signals, and respond appropriately and promptly (Ainsworth, Blehar, Waters, & Wall, 1978). Sensitivity is considered an affective and behavioural quality of the dyadic interaction between mother and infant, rather than solely a stable maternal characteristic (Nicholls & Kirkland, 1996; Thompson, 1997). Individual differences are influenced by a host of parental variables including personal attachment history, belief systems, culture, and ecological considerations such as

marital relationship, work environment, and social support, as well as socio-demographic factors such as education, and child characteristics (Bornstein, et al., 2007). Research that compares adolescent with adult mothers has typically found that maternal age is related to sensitivity, although findings are mixed (Bernier, et al., 2010).

A recent construct, mind-mindedness (Meins, 1997), defined as a mother's proclivity to treat her child as an individual with a mind and to view her infant's behaviour as meaningful, has been proposed as an important pre-requisite for maternal sensitivity. Meins and colleagues (Meins et al., 2012) suggest it is necessary to consider mind-related language, ascribing thoughts, feelings, ideas, and intentions to infants, in addition to caregiver behaviour to fully capture the richness of a caregiver's responding. Mind-mindedness, assessed in infancy, has been shown to predict attachment security, over and above any contribution of maternal sensitivity (Meins, et al., 2012).

Although a number of previous studies have found an association between mind-mindedness and maternal sensitivity (Demers, Bernier, Tarabulsy, & Provost, 2010b; Laranjo, Bernier, & Meins, 2008; Meins, Fernyhough, Arnott, Turner, & Leekam, 2011; Rosenblum, McDonough, Sameroff, & Muzik, 2008), some have not (Demers, Bernier, Tarabulsy, & Provost, 2010a; McMahon & Meins, 2012) and different approaches to the measurement of both constructs have compounded study comparisons. In contrast to sensitivity, mind-mindedness is believed to be a relatively stable way of thinking about specific close relationships that is not influenced by socio-economic factors, maternal psychological well-being, or infant characteristics (Meins, et al., 2011; Meins, Fernyhough, & Harris-Waller, 2014), although it may be related to maternal age. Demers et al. (2010b), found that adult mothers (aged > 20, mean age 28.7 years) made significantly more mind-related comments than adolescent mothers

when interacting with their 18-month old children, and a significant positive association was reported between maternal age (range 16-41 years) and mothers' mind-mindedness with younger infants aged eight months (Meins, Centifanti, Fernyhough, & Fishburn, 2013). In the current study we propose to examine relations among maternal age, the adaptive self-regulatory dimension of psychological maturity (hardiness), parenting control cognitions, and both mind-mindedness and maternal sensitivity as indicators of parenting quality.

### **Contextual Factors**

Parenting studies typically control for socio-demographic factors, such as education and income, and this may be particularly important when attempting to isolate the effects of maternal age given associations between delayed motherhood and socioeconomic advantage (Bornstein & Putnick, 2007). Some studies have found that more educated mothers are more sensitive (Bernier, et al., 2010; Schlomer & Belsky, 2012), while others have found no links between sensitivity and maternal verbal ability or socioeconomic status (Bornstein, et al., 2007). In contrast, many studies have found that mind-mindedness is not associated with maternal education or socio-demographic factors (e.g., McMahon & Meins, 2012; Meins, et al., 2011), however, Rosenblum et al. (2008) reported the converse.

Parenting quality is also known to be affected by parental psychological well-being, with negative affectivity, irritability, and depressive symptoms, even at non-clinical levels, linked to less active and involved parenting and less sensitive care (Belsky & Jaffee, 2006). Findings with respect to mind-mindedness suggest, however, that unlike sensitivity, mind-mindedness is unaffected by maternal depressive symptoms (Demers, et al., 2010a; Meins, et al., 2011). Child characteristics also influence parenting practices (Belsky, 1984; Bornstein, et al., 2007), with a 'difficult'

infant temperament (e.g. irritable, withdrawn, uncooperative) potentially disrupting the ability of a parent to interpret infant signals and respond appropriately (Sharp & Fonagy, 2008). Some parents, however, especially those from higher socio-economic backgrounds, have been found to respond in more supportive ways to a fussy infant (Bates, Schermerhorn, & Petersen, 2012). Previous findings regarding the relationship between infant temperament and mind-mindedness are mixed, with an association reported between maternal perception of a less difficult child and positive mind-minded descriptors of the child at 18-months (Demers, et al., 2010a), whereas Meins et al. (2011) found no associations between six dimensions of infant temperament and mind-mindedness assessed from a play interaction at seven months. The latter researchers cautioned against drawing a definitive conclusion until results are replicated in a larger sample. Consequently, maternal psychological distress and infant temperament will be considered as possible covariates together with maternal education.

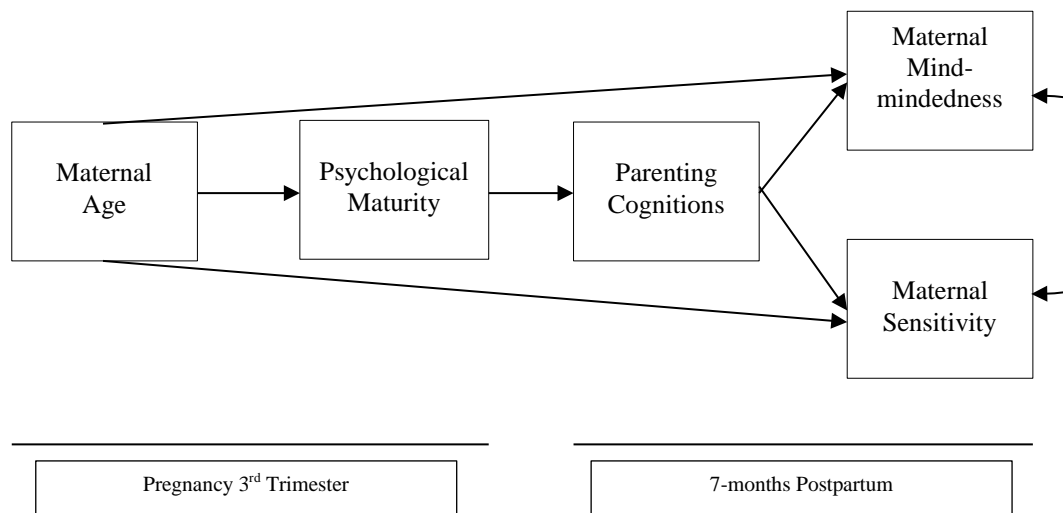
Older maternal age is associated with an increased likelihood of medically assisted conception due to age-related fertility decline (Schmidt, et al., 2012). Few studies of maternal age and parenting consider whether a history of infertility or medically assisted conception confounds results and studies of parenting in previously infertile women tend to control for maternal age in order to isolate the effects of assisted conception. Observational studies have consistently found no differences between previously infertile and spontaneously conceiving mothers with regard to maternal sensitivity (for a review see Hammarberg, Fisher, & Wynter, 2008). Some studies using self-report measures of parenting of older children, however, have reported that mothers who had conceived after fertility treatment were warmer and more emotionally involved with their children than spontaneously conceiving mothers



(Golombok, 2002). The current study will specifically consider whether the associations in the proposed model apply regardless of how the mother conceived.

### The Present Study

The aim of the current study was to examine relations between mother-infant interactive behaviour and older maternal age, while also exploring the possible mechanisms by which age may impact parenting behaviour, specifically through psychological maturity and parenting cognitions. Path analysis was used to test a model examining the direct effects of age on sensitivity and mind-mindedness, and the indirect effects of age through psychological maturity and parenting cognitions (see Figure 1).



*Figure 1.* Model of proposed relations among maternal age, psychological maturity, parenting cognitions, and parenting behaviour.

We predicted that older mothers would be more sensitive and mind-minded in their interactions with their infants. We also anticipated that age would have an indirect effect on maternal interactive behaviour via maturity and parenting cognitions, in that older mothers would be more psychologically mature (conceptualised using the

adaptive self-regulatory construct of hardiness), more hardy mothers would have greater perceived control with respect to parenting, and these control beliefs would be associated with more sensitive and mind-minded mother-infant interactions. In order to isolate the effects of age, higher education, maternal distress, and infant temperament were considered as possible confounds. Finally, we examined whether the associations in the model applied for both spontaneously conceiving women and those using fertility treatment.

## **Method**

### **Participants**

Participants were enrolled in a larger Australian prospective multi-site study – the Parental Age and Transition to Parenthood Australia (PATPA) study. Approximately equal numbers of pregnant women, both spontaneous and assisted conception, from ART clinics, and public and private antenatal clinics and classes in nearby hospitals were recruited stratified across three age groups: ‘younger’, 20–30 years; ‘middle’, 31–36 years; and ‘older’,  $\geq 37$  years. Older age was defined as 37 years or older, which is the age at which fertility decline accelerates (Gleicher, Weghofer, & Barad, 2007). Younger was defined as below the median age of birth in Australia at the time of the study, which was 31 years (Australian Bureau of Statistics, 2008). Inclusion criteria were as follows: English speaking, nulliparous pregnant women, aged 20 years or older. This paper reports on a subset of participants recruited in metropolitan Sydney who consented to take part in an optional component of the study involving a postnatal home visit.

Five hundred and nineteen eligible women in Sydney were provided with information about the PATPA study, 317 (61%) consented to participate, and 266 (84% of consenting women) completed all antenatal and postnatal measures. At four months

postpartum, women who had given birth to a single baby ( $n = 253$ ) were invited to participate in an additional home visit when their baby was seven months of age. Seventy percent ( $n = 178$ ) expressed interest, with 154 (87% of interested women) subsequently completing the home visit. Due to incomplete data, results reported here concern 143 women and their babies.

Table 1 shows the demographic and contextual characteristics of participants by recruitment age group and mode of conception in the third trimester of pregnancy. The mean age of participants was 33.4 years ( $SD = 4.8$  years, range 26 – 43 years). Approximately 59% ( $n = 84$ ) conceived spontaneously, 35% ( $n = 50$ ) following ART, and 6% ( $n = 9$ ) had other fertility treatment (fertility drugs, ovulation induction, or intrauterine insemination), but not ART. For analyses, women who conceived using either ART or other fertility treatment ( $n = 59$ , 41%) were grouped together as the ‘fertility treatment’ group. A small percentage ( $n = 12$ ; 8%) of pregnancies in the spontaneous conception group were not planned. The majority of participants had a partner (98%), were university educated (65%), worked in professional occupations (77%), and spoke only English at home (80%).

Infants were 79 boys and 64 girls with a mean gestational age of 39 weeks ( $SD = 1.5$ ); 96% of women gave birth at full term (at least 37 weeks gestation). At four months postpartum, 99% ( $n = 142$ ) of mothers reported their infants to have ‘good, very good, or excellent’ health, with one infant’s health rated as ‘fair’.

Table 1

*Participant Demographic and Contextual Characteristics by Recruitment Age Group and Mode of Conception Group*

		<b>Age Group</b> <b>≤ 30</b> <b><i>n</i> = 49</b>	<b>Age Group</b> <b>31-36</b> <b><i>n</i> = 46</b>	<b>Age Group</b> <b>≥ 37</b> <b><i>n</i> = 48</b>	<b>Total Sample</b> <b><i>N</i> = 143</b>	<b>Spontaneous</b> <b>Conception</b> <b><i>n</i> = 84</b>	<b>Fertility</b> <b>Treatment</b> <b><i>n</i> = 59</b>
Age <sup>1 2 a</sup>	M (SD)	28.02 (1.39)	33.35 (1.80)	39.02 (1.76)	33.43 (4.84)	31.73 (4.37)	35.85 (4.45)
Tertiary education	<i>n</i> (%)	31 (63%)	32 (70%)	30 (63%)	93 (65%)	54 (64%)	39 (66%)
Partnered	<i>n</i> (%)	49 (100%)	44 (96%)	46 (96%)	140 (97%)	81 (98%)	58 (99%)
English-only at home	<i>n</i> (%)	40 (82%)	37 (80%)	38 (79%)	115 (80%)	69 (82%)	46 (78%)
Professional Occupation	<i>n</i> (%)	34 (69%)	37 (80%)	39 (83%)	110 (77%)	61 (73%)	49 (84%)
Fertility treatment <sup>1 b</sup>	<i>n</i> (%)	10 (20%)	17 (37%)	32 (67%)	59 (41%)	–	–

*Note.* <sup>1</sup> Age groups differ at  $p < .01$ ; <sup>2</sup> Mode of conception groups differ at  $p < .01$ ; <sup>a</sup> Age range of participants 26 – 43 years. <sup>b</sup> Due to sampling strategy proportion not representative of general population.

## Procedure

After obtaining ethical approval from relevant institutional ethics committees, consenting women participated in a structured telephone interview and completed questionnaires in the third trimester of pregnancy ( $M_{\text{gestation}} = 31.7$  weeks,  $SD = 2.5$  weeks) and at four months postpartum ( $M_{\text{babyage}} = 18.8$  weeks,  $SD = 4.7$  weeks). A home visit was undertaken when infants were approximately seven months of age ( $M_{\text{babyage}} = 7.26$  months,  $SD = .78$  weeks) during which mothers completed a series of questionnaires and a 15-minute mother-infant play interaction was filmed. A set of developmentally appropriate toys was provided for the play interaction, including a ball, stackable plastic cups, a set of farm animals, a rattle, a soft toy, and a jack-in-the-box. Mother and infant were seated on the floor, and mothers were instructed to play with the toys and their infant as they normally would.

## Measures

**Participant Characteristics.** Demographic (age, education, relationship, employment, language spoken at home) and reproductive history (mode of conception information was collected in pregnancy, and birth (method, gestation) and infant characteristics (sex, birth weight) at four months postpartum.

**Psychological Maturity: Hardiness.** During the third trimester of pregnancy participants completed the Personal Views Survey 3<sup>rd</sup> Edition, Revised (PVS-III-R; Maddi & Khoshaba, 2001), an 18-item questionnaire designed to assess psychological hardiness. Items are responded to on a 4-point scale from 0 (*not true at all*) to 3 (*very true*). Items cluster to form three subscales; commitment (being involved; e.g., “Trying your best at what you do usually pays off in the end”), control (being influential; e.g., “Most of the time, people listen carefully to what I have to say”), and challenge

(continual learning; e.g., “Changes in routine provoke me to learn”). The summed score of all scale items reflects the ability to cope effectively with stressful circumstances, with a higher score (range 0 – 54) indicating greater hardness. Reliability for the current sample was acceptable (Cronbach’s  $\alpha = .76$ ).

**Infant Temperament.** At four months postpartum, mothers completed the Short Temperament Scale for Infants (Sanson, Prior, Garino, Oberklaid, & Sewell, 1987), a 30 item scale assessing infant behaviours responded to on a 6-point scale from 1 (*almost never*) to (*almost always*). A composite score, the Easy-Difficult Scale, is calculated by averaging scores across approach-withdrawal (e.g., “For the first few minutes in new place or situation the baby is fretful”), cooperation (e.g., “The baby continues to fret during nappy change in spite of efforts to distract”), and irritability (e.g., “The baby continues to cry in spite of several minutes of soothing”). Higher scores suggest a more ‘difficult’ temperament. Reliability for the current sample was acceptable ( $\alpha = .67$ ).

**Parenting Beliefs: Parental Locus of Control.** During the home visit mothers completed the Parental Locus of Control Scale (PLOC; Campis, et al., 1986). The scale comprises 47 items responded to on a 5-point scale from 1 (*strongly agree*) to 5 (*strongly disagree*) designed to assess locus of control beliefs regarding child-rearing and control orientation in the parent-child relationship. Items yield five dimensions: parental efficacy (e.g.; “What I do has little effect on my child’s behaviour”), parental responsibility (e.g.; “The misfortunes and successes I have had as a parent are the direct result of my own behaviour”), child control of parent’s life (e.g.; “I feel like what happens in my life is mostly determined by my child”), parental belief in fate/chance (e.g.; “Heredity plays the major role in determining a child’s personality”), and parental control of child’s behaviour (e.g.; “I always feel in control when it comes to my child”).

Higher total scores (range 47 – 235) indicate a more external locus of control. Reliability for the current sample was  $\alpha = .76$ .

**Maternal Distress.** Mothers also completed The Parenting Stress Index, Short Form (PSI; Abidin, 1995), a 36 item scale designed to assess overall level of stress related to parenting. The PSI has three subscales, only one of which, the parental distress scale (PDS), was used in the current study. The PDS consists of 12 items (e.g., I don't enjoy things as I used to") responded to on a 5-point scale from 1 (*strongly agree*) to 5 (*strongly disagree*), and determines the distress experienced by the parent in their parenting role as a function of sense of competence, restriction on other roles, partner conflict, lack of social support and depression. A higher score indicates a higher level of distress. Reliability for the current sample was high ( $\alpha = .83$ ).

**Quality of Mother-Infant Interaction.** Recordings of the episode of 15-minute mother-infant play were assessed independently for maternal sensitivity and mind-mindedness by two separate coders blind to participant variables and study hypotheses. A second coder assessed a randomly selected 20% ( $n = 30$ ) of the mother-infant interactions.

**Maternal sensitivity** was assessed using the National Institute of Child Health and Human Development (NICHD) Qualitative Ratings of Mother/Child Interaction at 6 Months (NICHD Early Child Care Research Network, 1999; Owen, 1992), which contain two sensitivity scales, sensitivity to distress and sensitivity to non-distress. Only the sensitivity to non-distress scale was used, as few infants displayed any distress during the free play observation. The sensitivity to non-distress scale is a 4-point global rating scale of maternal behaviour ranging from 1 (*not at all characteristic*) to 4 (*highly characteristic*) assessing how observant and responsive the mother is to the child's signals, with aspects of contingency, synchrony, mutuality, and appropriateness

considered. The key component of sensitivity is that the interaction is child centred. Inter-rater reliability (intra-class correlation coefficient) was .82.

**Maternal Mind-mindedness.** A mother's tendency to comment on her infant's mental states was assessed in accordance with the Mind-Mindedness Coding Manual Version 2.0 (Meins & Fernyhough, 2010). Maternal speech during the play session was transcribed verbatim, and any comment made by the mother using an explicit internal state term to reflect what the infant may be thinking, experiencing, or feeling, e.g. "you like the toys that make noise", "you don't know what to choose", or statements speaking for the infant, e.g. "yes, I think I want the turtle" were identified as mind-minded. In accordance with the manual, mind-minded comments were then classed as either 'appropriate' or 'non-attuned' according to the coder's agreement or disagreement with the mother's interpretation of the infant's internal state from watching the recording of the interaction. Non-attuned comments were of low frequency and only appropriate mind-mindedness was considered. Two mind-mindedness scores were calculated: total number of appropriate mind-minded comments (total MM) and proportional appropriate mind-minded comments (proportional MM), calculated as a proportion of the total number of comments made by the mother. Higher scores on each indicated higher levels of appropriate mind-mindedness. The proportional score was used in analyses in order to control for overall verbosity of mothers, as recommended in the coding manual (Meins & Fernyhough, 2010), however the total and proportional scores were highly correlated,  $r(143) = .81, p < .001$ . The intra-class correlation for number of appropriate mind-minded comments was .99.



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**Data Analysis**

Preliminary analyses were undertaken to identify missing data and test for normality of continuous variables. Zero-order and point biserial correlations assessed bivariate relationships among study variables and relationships between possible confounding variables and parenting outcomes. Path analyses were conducted using AMOS (Version 21; Arbuckle, 2010). First, both the direct and indirect effects of age on mother-infant interaction were examined with sensitivity and mind-mindedness included as two separate outcomes in the one model. The bootstrapping procedure was used to test the indirect effects proposed (see Figure 1). Second, to investigate whether age contributes to maternal interactive behaviour over and above any indirect effects via psychological maturity and parenting cognitions, the direct effect of age on sensitivity and mind-mindedness was constrained to be zero (in separate analyses for each parenting outcome) and model fit was re-evaluated. Third, following evaluation of age effects, control variables found to be related to parenting behaviour were included and model fit re-evaluated. Finally, a multi-group invariance analysis was undertaken to determine whether the relationships in the model applied equally for spontaneous conception and fertility treatment groups.

In order to overcome the sensitivity to sample size problem inherent in the chi-squared goodness of fit index, the following fit indices and criteria of a good fit were also used:  $\chi^2/df$  with a value less than 2 (Wheaton, Muthén, Alwin, & Summers, 1977), Tucker-Lewis index (TLI; Tucker & Lewis, 1973) and comparative fit index (CFI; Bentler, 1990) with values of .95 or greater, and root mean square error of approximation (RMSEA; Browne & Cudeck, 1993) with values less than .06 (Hu & Bentler, 1999).

## Results

### Preliminary Analyses

Less than 5% of all questionnaire items were missing. Mean substitution was used on scales where fewer than 10% of items were missing (hardiness). Assumptions of normality were satisfied. The mean for maternal sensitivity (2.55, SD .78) was comparable with, but slightly lower than that of NICHD normative data from the United States (mean 3.01, SD .74). The mean proportion of appropriate mind-minded comments (8.19, SD 3.79) was similar to that reported by Meins and colleagues in a community sample of British mothers with infants aged seven months (mean 9.81, SD 4.46) (Meins, et al., 2011) and slightly higher than the mean reported in mothers with eight month old infants (mean 5.34, SD 3.64) (Meins, et al., 2012).

### Bivariate Correlations

Results of Pearson product-moment and point biserial correlations, means and standard deviations of study variables are shown in Table 2. Maternal age was significantly positively associated with hardiness and mind-mindedness, but not with parental locus of control or sensitivity. Older mothers were more likely to have conceived using fertility treatment. Hardiness was significantly associated with a more internal parental locus of control but not with sensitivity or mind-mindedness, while parental locus of control was significantly associated with both mind-mindedness and sensitivity. There was no significant association between sensitivity and mind-mindedness. Of the potential covariates, only tertiary education was significantly associated with sensitivity and was therefore included in subsequent path analyses. Infant temperament, maternal distress and infant gender were not associated with age,

sensitivity or mind-mindedness and were not considered further, all  $r_s < .1$ ,  $p_s > .10$  (not in Table 2).

### Path Models

Initially, the model proposed in Figure 1 was assessed. Both direct and indirect effect of age on sensitivity and mind-mindedness were examined in the one analysis. Results indicated that maternal age was associated with greater mind-mindedness ( $\beta = .18$ ,  $p < .05$ ), mothers who were older reported higher levels of hardiness ( $\beta = .18$ ,  $p < .05$ ), hardiness was associated with a more internal parental locus of control ( $\beta = -.40$ ,  $p < .001$ ), and a more internal parental locus of control was associated with higher scores for maternal sensitivity ( $\beta = -.17$ ,  $p < .05$ ) and mind-mindedness ( $\beta = -.21$ ,  $p < .01$ ). Maternal age was not significantly related to sensitivity ( $\beta = -.03$ ,  $p = .70$ ). All three tests of the indirect effect of age were significant, indicating that maternal age was associated with greater hardiness and, via hardiness, a more internal parental locus of control ( $\beta = -.07$ ,  $p < .05$ ); that maternal age was associated with a more internal parental locus of control and, via locus of control, higher scores for sensitivity ( $\beta = .01$ ,  $p < .05$ ) and mind-mindedness ( $\beta = .02$ ,  $p < .05$ ). Additionally, there was a significant indirect effect of hardiness, in that mothers with greater hardiness had a more internal parental locus of control and, via locus of control, higher scores for mind-mindedness ( $\beta = .08$ ,  $p < .01$ ), and marginally greater sensitivity ( $\beta = .07$ ,  $p = .06$ ). The fit indices for this model were acceptable;  $\chi^2(4) = 2.00$ ,  $p = .74$ ;  $\chi^2/df = .50$ ; TLI = 1.13; CFI = 1.00; and RMSEA = .00 (90% CI [.00, .09]).

Table 2

*Correlation Matrix and Means (M) and Standard Deviations (SD) of Study Variables*

Variable	1	2	3	4	5	6	M	SD
1. Age	-						33.43	4.84
2. Hardiness	.18 <sup>*</sup>	-					40.47	5.29
3. Parental locus of control	-.13	-.40 <sup>**</sup>	-				115.98	12.16
4. Mind-mindedness	.21 <sup>**</sup>	.07	-.23 <sup>***</sup>	-			8.19	3.79
5. Sensitivity	-.01	.11	-.17 <sup>*</sup>	-.03	-		2.55	.78
6. Tertiary education (0=no, 1 = yes)	-.01	.21 <sup>**</sup>	.03	.08	.20 <sup>*</sup>	-	—	—
7. Fertility treatment (0 = no, 1=yes)	.42 <sup>***</sup>	.14	-.09	.05	.04	.02	—	—

\*  $p < .05$ . \*\*  $p \leq .01$ . \*\*\*  $p < .001$ .

In order to investigate whether the direct effect of age on parenting behaviour added any explanatory variance over and above the indirect effect of age via psychological maturity and parenting cognitions, direct age effects were constrained to be zero and model fit re-evaluated in separate analyses for each parenting outcome (sensitivity and mind-mindedness). Constraining the direct effect of age on sensitivity did not result in a significant worsening of model fit,  $\Delta\chi^2(1) = 0.15$ ,  $p = .70$ , and this restraint was therefore accepted. However, constraining the direct effect of age on mind-mindedness resulted in significant worsening of model fit,  $\Delta\chi^2(1) = 4.83$ ,  $p < .05$ , and this restraint was not retained. The fit indices for the final model without a direct age effect on sensitivity, but retaining the direct path between age and mind-mindedness were as follows:  $\chi^2(5) = 2.14$ ,  $p = .83$ ;  $\chi^2/df = .43$ ; TLI = 1.15; CFI = 1.00; and RMSEA = .00 (90% CI [.00, .07]). The indirect effects of age and hardiness remained significant and unchanged from the initial model evaluated. Figure 2 shows results for this model with standardised coefficients.

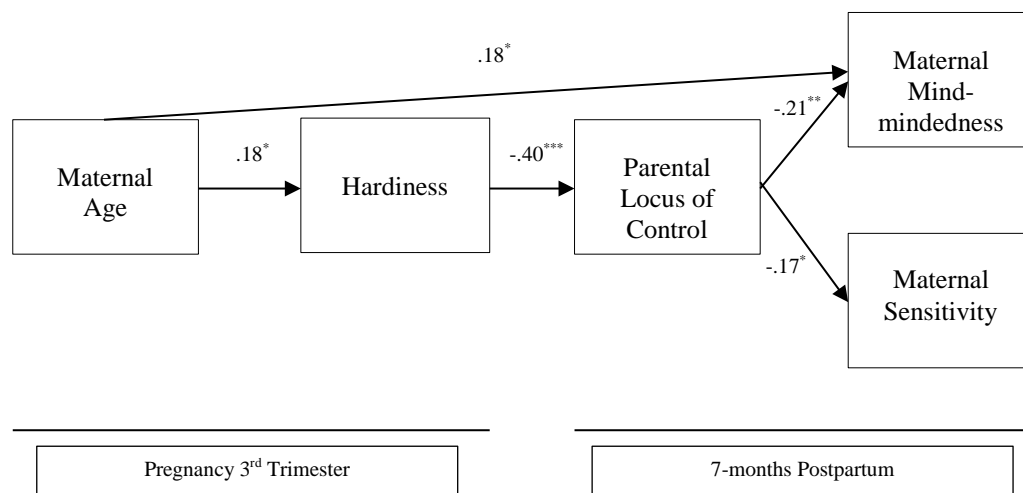


Figure 2. Path analysis showing final model with standardised coefficients for significant paths. Fit statistics:  $\chi^2(5) = 2.14$ ,  $p = .83$ ;  $\chi^2/df = .43$ ; TLI = 1.15 CFI = 1.00; and RMSEA = .00 (90% CI [.00, .07]).

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

In order to control for the possible confounding effect of maternal education on parenting behaviour, the final model was re-evaluated with education included as a predictor of all endogenous variables (hardiness, parental locus of control, sensitivity, mind-mindedness) and co-varying with age. Previous results were largely unchanged (all significant paths remained so), and additionally there were significant paths between education and hardiness ( $\beta = .21, p < .01$ ) and education and sensitivity ( $\beta = .21, p = .01$ ). Fit indices for this model remained acceptable:  $\chi^2(5) = 2.56, p = .77$ ;  $\chi^2/df = .51$ ; TLI = 1.14; CFI = 1.00; and RMSEA = .00 (90% CI [.00, .08]).

Finally we tested whether the model applied for both modes of conception (spontaneous or fertility treatment). Although mode of conception was not correlated with any study variable except age, an invariance analysis was undertaken in AMOS. Structural paths in the final model including education as a covariate were constrained to be the same for each mode of conception group and model fit was compared with a model where the paths for each group were not constrained but were free to vary. The global chi-square values were not significantly different between the constrained and unconstrained models,  $\Delta\chi^2(9) = 9.56, p = .39$ , suggesting the model performed similarly across mode of conception groups. Fit statistics for the constrained model were as follows:  $\chi^2(19) = 19.14, p = .49$ ;  $\chi^2/df = 1.01$ ; TLI = .97; CFI = 1.00; and RMSEA = .01 (90% CI [.00, .07]).

### **Discussion**

Given the changing demography of parenthood, older maternal age has re-emerged as a focus when examining the determinants of parenting (Schlomer & Belsky, 2012). Results from the current study suggest that older maternal age contributes to parenting in infancy indirectly through psychological maturity and its effect on parenting cognitions, specifically a more internal locus of control with regards to

parenting, which is associated with greater attunement to the infant (assessed here as greater sensitivity and mind-mindedness). Age is also directly positively related to mind-mindedness, a mother's ability to appropriately articulate her infant's likely emotional and cognitive experience. These associations applied after controlling for the effect of education and regardless of mode of conception. Both age and psychological maturity are, therefore, important contributors to the quality of maternal interactive behaviour.

### **Maternal Age and Parenting**

The direct association between maternal age and mind-mindedness is consistent with previous results (Demers, et al., 2010b; Meins, Centifanti, et al., 2013) and extends findings to mothers at the older end of the childbearing-age spectrum. Interestingly, maternal age contributed to mind-mindedness over and above the indirect effect of age via the psychological characteristics (hardiness, parenting cognitions) considered in this study. This suggests that other factors related to age may enable a mother to recognise and comment appropriately on her infant's internal experience.

Contrary to prediction, there was no direct association between maternal age and sensitivity. Previous findings generally support the relations between increasing age and sensitive parenting (e.g., Bornstein, et al., 2006; Broom, 1994), although this association has not always been found (Bernier, et al., 2010). Our divergent finding may be due to the socio-demographic characteristics (generally high) and age range of participants (26 to 43 years), given previous research has usually included teenage mothers and more socio-demographically diverse samples. In this study, two-thirds of participants were aged over 30, and participants, even younger mothers, were predominantly tertiary educated and in professional occupations. Previous findings by Bornstein and colleagues (Bornstein & Putnick, 2007; Bornstein, et al., 2006) showed

that associations between maternal age and sensitivity were not consistent across the full maternal age range with a lack of association found after age 30. Additionally, inconsistencies in how sensitivity is defined and assessed make between-study comparison difficult (Behrens, Hart, & Parker, 2012).

Methodological differences in the assessment of sensitivity and mind-mindedness may also help explain why the two were not related, even though they appear to be influenced by the same maternal characteristics examined in this study and mind-mindedness is proposed to be a prerequisite for sensitivity (Laranjo, et al., 2008; Meins, 1997). In research where an association between sensitivity and mind-mindedness has been reported, sensitivity has been variously assessed, for example, using the Ainsworth sensitivity scale (Meins, et al., 2011; Meins, et al., 2012), or the Maternal Behaviour Q-Sort (Bernier, et al., 2010; Demers, et al., 2010a, 2010b; Laranjo, et al., 2008). McMahon and Meins (2012) however, found no association between mind-mindedness and sensitivity assessed using the Emotional Availability Scales (Biringen, Robinson, & Emde, 1998), with a similar lack of association in the current study assessing sensitivity using the NICHD sensitivity scale. Additionally, rather than associations between the proportion of appropriate mind-minded comments and sensitivity, some studies have found relations between sensitivity and the valence, richness, or type of mind-related comment (Demers, et al., 2010a; Laranjo, et al., 2008).

The lack of association between sensitivity and mind-mindedness may also reflect a genuine difference between these constructs. Mind-mindedness is characterised as a form of ‘online’ parental mentalization whereby the caregiver explicitly acknowledges the infant’s mental state (Sharp & Fonagy, 2008), while sensitivity focuses on the behavioural manifestations of an awareness of the infant’s internal experience (Nicholls & Kirkland, 1996). For example, in the current study, a



mother makes an appropriate mind-minded comment “You like that turtle don’t you” while her infant plays with a toy; she then physically moves the infant to direct his attention elsewhere and says “Wow, look at all these toys”. Although this interaction would score for appropriate mind-mindedness, it would not be assessed as highly sensitive as the mother overrides her correct appreciation of her infant’s mental state (pleasure in playing with a particular toy) to redirect her infant to an alternate task in which the infant has not indicated any interest.

Although Meins and colleagues suggest that mind-mindedness and sensitivity tap similar aspects of sensitive responsiveness, they also acknowledge that they are distinct aspects of mother-infant interaction, can operate independently, and that verbal comments are one of several ways in which a mother can show her recognition of her infant’s internal state (Meins, 2011, 2013; Meins, et al., 2011). It was noted in the current study that some mothers demonstrated high behavioural indices that they recognised their infant’s interests or preferences without explicitly stating this. Nevertheless, age was indirectly related to both aspects of maternal interactive behaviour (sensitivity and mind-mindedness) and to parental locus of control through the relationship with hardiness.

### **Psychological Maturity, Parenting Cognitions and Parenting Behaviour**

Sameroff and Feil (1985) suggest that a parent’s complexity of developmental thought, which influences interpretation of child behaviour and, by extension, parental behaviour, ranges from simple and more concrete to an increasingly broad transactional perspective. Current results support this idea in that the older, more psychologically mature mother holds parenting beliefs that directly contribute to an overt appreciation of her infant’s internal experience (mind-mindedness) and responsive maternal interactive behaviour (sensitivity).

Findings regarding an association between maternal age and hardiness replicate results from the larger study from which this sample was drawn (see Camberis, et al., in press; McMahon et al., 2011), as well as from previous research (McMahon et al., 2007). In the current study, although older maternal age was related to higher levels of hardiness, a self-regulatory characteristic believed to enable perspective taking and flexibility (Kobasa, et al., 1982), hardiness did not directly predict parenting behaviour. This is somewhat surprising given previous findings of relations between psychological maturity, assessed using a range of constructs, and parenting (Belsky & Barends, 2002; Heinicke, 1984; van Bakel & Riksen-Walraven, 2002). As psychological maturity has been shown to impact adaptation to early parenthood (Camberis, et al., in press; Feldman & Nash, 1986) it may be that hardiness provides advantages for parenting at an earlier time point, with any differences attenuating by seven months postpartum when mothers are more established in the parenting role, and when infants are more regulated and better able to communicate and interact with caregivers. Results from previous studies also show that maturity is often predictive of different dimensions of parenting behaviour (e.g., warmth, stimulation, expressivity), and that only some personality traits predict parenting quality (Belsky & Barends, 2002; Bornstein, Hahn, & Haynes, 2011; de Haan, et al., 2009). This makes reconciling findings difficult and also suggests that hardiness may directly impact other aspects of parenting behaviour not specifically examined in the present research.

As noted, associations between hardiness and parenting were indirect via parental locus of control, with higher scores for hardiness in pregnancy facilitating a greater sense of efficacy and control over parenting when infants were aged around 7-months. Hardiness, like parental locus of control, focuses on the tendency to feel and act as if one has a definite influence (Kobasa, et al., 1982). This finding provides

support for the assumption that hardiness enables adaptation to changing environments through the effects of cognitive appraisals (Funk, 1992; Gramzow, et al., 2000), and also empirically confirms the suggestion that perception of control with respect to parenting stems from parental personality (Hagekull, et al., 2001). This later result contributes to the understanding of the psychological mechanisms by which parental characteristics impact parenting (Belsky & Barends, 2002; de Haan, et al., 2009).

Mothers who appraised child developmental outcomes as a consequence of their own parenting efforts were more sensitive and made proportionally more mind-minded comments when interacting with their infants. This is consistent with previous findings that a more internal locus of control and greater self-efficacy with respect to parenting are positively related to maternal sensitivity (Bornstein, et al., 2007; Teti, et al., 1996). A relationship between mind-mindedness and parenting beliefs has not previously been explored to our knowledge, and this finding supports the proposition that mind-mindedness stems from a mother's appraisal of her relationship with her child (Meins, et al., 2011). In a recent study, Meins et al. (2014) suggest that mind-mindedness is not a trait but a relational construct that applies to representations of individuals with whom one has a close personal relationship. Current findings are consistent with this conceptualisation, as mind-mindedness was not directly related to hardiness (a trait), whereas mind-mindedness was associated with cognitions specific to the parent-child relationship.

Current findings also suggest that parenting interventions could be targeted at the level of personality dispositions as well parenting cognitions directly. Hardiness has been shown to be responsive to a training procedure emphasising effective coping, social support, and beneficial self-care that successfully increases hardiness and reduces ongoing strain (Maddi, 2002; Maddi, et al., 2011). This perhaps might benefit younger

mothers or those at risk of parenting difficulties to develop internal resources that may strengthen beliefs regarding parenting efficacy and control in addition to an understanding of the importance of responsive parenting behaviours for child development outcomes.

### **Contextual factors**

Current findings confirmed the well-established association between education and maternal sensitivity (Bornstein, et al., 2007) and lack of association between education and mind-mindedness (McMahon & Meins, 2012; Meins, et al., 2011). Mothers who had completed tertiary education were more sensitive when interacting with their infants, even with the effects of age, maturity, and parenting cognitions included in the model. Education is related to a more sophisticated cognitive orientation (Bornstein, et al., 2007; Hubbs-Tait, et al., 2006), which may help explain why mothers with tertiary education are better able to read their infant's signals and respond in a sensitive way. However, consistent with previous research, this orientation does not appear to impact mind-mindedness in the same manner, despite maternal education being related to interactional style through linguistic responsiveness (Garrett, Ferron, Ng'Andu, Bryant, & Harbin, 1994). Mind-mindedness requires that the mother's verbal response be a specific and appropriate inference about her infant's likely internal state, and this ability does not appear to be related to tertiary education.

The absence of associations between parenting quality and maternal distress and infant temperament are also worth noting. It may be that relatively low levels of maternal distress in this socio-demographically advantaged sample were not sufficient to negatively impact maternal sensitivity, at least for the short duration of the play episode from which parenting quality was assessed, although an absence of relations between sensitivity and maternal psychological wellbeing is not without precedent (e.g.,

Broom, 1994). A similar lack of association between mind-mindedness and symptoms of depression have also been previously reported (Demers, et al., 2010a; Meins, et al., 2011; Rosenblum, et al., 2008), although relations between parenting stress and mind-mindedness have been found (Demers, et al., 2010a; McMahon & Meins, 2012).

The infant temperament finding replicated, in this larger sample, Meins et al.'s (2011) finding of a lack of association between six infant temperament dimensions and mind-mindedness, lending further support to the characterisation of mind-mindedness as a maternal quality, rather than a response to specific infant characteristics. The lack of relationship between infant temperament and maternal sensitivity is also in line with some previous findings (McElwain & Booth-LaForce, 2006) but contrary to others (Kivijärvi, Räihä, Kaljonen, Tamminen, & Piha, 2005). This may reflect a genuine lack of association between maternal ratings of easy-difficult temperament at four months and later interactive behaviour at 7-months, or suggest a more complex transactional relationship between temperament and parenting (Bates, et al., 2012; Belsky & Jaffee, 2006) not explored in this study.

Results suggesting that the relationships in the model applied to both mothers who conceived spontaneously and those conceiving after fertility treatment are also consistent with previous findings indicating comparable mother-infant interactive behavior between previously infertile and spontaneously conceiving mothers in the first year of parenthood (Hammarberg, et al., 2008).

### **Limitations**

The homogenous nature of the sample limits the generalizability of results to English-speaking, socio-economically advantaged women living in a metropolitan area. However, as this study investigated the effects of first-time motherhood at older ages in a sample of participants that excluded teenage mothers and oversampled mothers in the

older age spectrum, the findings with regard to age are robust and sample characteristics (educated, partnered, professional) are typical of older first-time mothers (Bornstein & Putnick, 2007; Carolan & Frankowska, 2011; Schmidt, et al., 2012).

A further limitation was restricting observations of parenting to a single play episode. Sensitivity and mind-mindedness were therefore assessed from the same episode of play raising issues of shared method variance. Mothers were able to devote all their attention to infant activities whereas a naturalistic observation or more realistic high demand situation may be a more valid approach (Behrens, et al., 2012; Laranjo, et al., 2008).

Additionally, the reliance on maternal self-report measures of predictors of parenting behaviour is potentially limiting, however measures were completed at different time-points (hardiness in pregnancy, infant temperament at four months postpartum, and locus of control when infants were aged around seven months), and findings in line with theorised associations suggest these assessments were valid. Concerns have previously been raised that measures of parental social cognition, such as the parental locus of control scale, may actually tap variance related to other constructs with results reflecting an absence of distress or socially desirable responding rather than specific beliefs about parenting (Lovejoy, Verda, & Hays, 1997). Similar concerns have been raised regarding the hardiness measure (Funk, 1992). Revisions to the hardiness scale however, show that hardiness is empirically distinct from negative affectivity or neuroticism and unrelated to socially desirable responding (Maddi, et al., 2011). The moderate correlation between hardiness and parental locus of control, and the fact that only parental locus of control was directly associated with parenting, suggest that, although associated, these constructs are distinct. Future studies using observational measures of infant temperament and alternate, and perhaps more

comprehensive measures of psychological maturity and parenting cognitions may further clarify the relationships between maternal and infant characteristics and parenting in infancy.

### **Conclusion**

The findings of this study contribute to a growing body of research regarding the unique impact of chronological age on maternal parenting behaviour (Bornstein, et al., 2006; Ragozin, et al., 1982). Age has direct and indirect relations with different aspects of parenting in infancy even after controlling for socio-demographic and contextual factors. Results provide empirical support for the notion that older mothers are more psychologically mature and that this maturity is associated with adaptive parenting cognitions that in turn directly contribute to more sensitive and mind-minded mother-infant interactions. Additionally, irrespective of maturity or parenting cognitions, older mothers have a tendency to make more mind-related comments regarding their infant's likely internal states. Given the importance of maternal sensitivity and mind-mindedness for children's development (Bornstein, Hahn, Suwalsky, et al., 2011; Meins, Fernyhough, Arnott, Leekam, & de Rosnay, 2013), current findings suggest that older maternal age provides some psychosocial benefits to offspring in early childhood.

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## **Chapter 6: General Discussion**

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## **General Discussion**

In the context of the trend towards delayed childbearing, this study examined whether older first-time mothers are more psychologically mature, and whether maturity provides any adaptive benefit during the transition to parenthood. The hypothesised links between age, psychological maturity, and parenthood arise from two theoretical perspectives. Firstly, the changing social structure of the life-course contributes to women delaying childbearing until they have attained other adult milestones and feel psychologically ready for children (Carolan, 2005; Daly, 2011). Secondly, parenting models (Belsky, 1984; Heinicke, 1984) propose that parental psychological characteristics are a particularly important determinant of parenting. Women who become mothers at older ages, therefore, may possess psychological resources that contribute to more optimal adjustment across the transition to parenthood as well as to responsive parenting in infancy. Few studies have examined relations among maternal age, well-defined and comprehensive measures of psychological maturity, and specific outcomes across the transition to parenthood. The current study sought to make a unique contribution by examining these associations.

The proposed age-related psychological advantage for women embarking on motherhood at older ages is in contrast to the biological and medical risks associated with childbearing at an older age, including a greater likelihood of requiring assisted reproductive technologies to conceive (ART; Schmidt, Sobotka, Bentzen, & Nyboe Andersen, 2012) and a well-established link between increasing maternal age and obstetric complications (Carolan & Frankowska, 2011). Additionally, largely unsubstantiated negative views regarding the limited parenting capacity of older mothers due to compromised physical capabilities and limited stamina are also common (Bornstein & Putnick, 2007; Shaw & Giles, 2009).

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This research was nested in a larger prospective study, Parental Age and Transition to Parenthood Australia (PATPA). Using a subsample of participants, the current research aimed to supplement findings from the larger PATPA study by undertaking an in-depth examination of psychological maturity and its relations with maternal age and adaptation during the transition to parenthood. Psychological maturity was operationalised in a broad and novel way, prospective adjustment during pregnancy and the early postnatal months was examined, parenting in infancy was assessed using observational measures, and the contribution of contextual factors associated with first-time parenthood at older maternal age such as tertiary education, health, and assisted conception was also specifically considered.

Participants were aged across the ‘normative’ childbearing-age spectrum (24 to 43 years), with ‘older’ women and women who conceived with medical assistance oversampled relative to population rates. For recruitment purposes, ‘older’ was defined as 37 years or more, the age at which fertility decline accelerates (Gleicher, Weghofer, & Barad, 2007), in order to ensure adequate representation of women childbearing at the older end of the reproductive-age spectrum. However, age was considered as a continuous variable in all analyses, and results, therefore, reflect the relations among increasing age across the age spectrum of participants in this study and the outcomes considered, rather than a comparison of women aged 37 and older with those aged younger than 37. References to ‘older’ women in this chapter refer to increasing age across this age range.

Together, the three studies that comprise this thesis build a coherent picture regarding the transition to motherhood with respect to three aspects of adaptation, specifically psychosocial adjustment in pregnancy and the early postpartum, maternal

mental health during this period, and responsive parenting in infancy. This final chapter presents a broad overview of findings including implications of the research, whilst acknowledging both the limitations and strengths of the study. The final section outlines possible avenues for future research.

## **Summary and Implications of Key Findings**

### **Age, Psychological Maturity and Adaptation to Parenthood**

The findings from this research suggest that older first-time mothers are more psychologically mature, and that maturity, rather than age per se, plays an important role in adaptation during the transition to motherhood. Age-related psychological maturity contributed positively to the formation of a maternal identity in pregnancy and more optimal adjustment to motherhood in the early postnatal months, to fewer mental health symptoms in pregnancy and postnatally, and conferred some advantages for parenting in the first postnatal year.

Results make a number of contributions to a growing body of research concerned with first-time motherhood at older ages (Barnes, Gardiner, Sutcliffe, & Melhuish, 2013; Bornstein & Putnick, 2007; Schlomer & Belsky, 2012). Although age has frequently been considered a marker for maturity (Belsky, 1984; Bornstein, Putnick, Suwalsky, & Gini, 2006), the relationship between age and maturity has rarely been systematically considered in studies examining maternal adjustment and parenting (Belsky & Barends, 2002). In previous parenting studies, age effects have frequently been ascribed to psychological characteristics (often referred to as ‘maturity’) postulated to be associated with chronological age (Bornstein, et al., 2006; Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). Current results empirically confirm a significant, albeit modest, association between older age and greater psychological



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maturity, thereby addressing a gap in the literature regarding this hypothesised relationship. In addition, by operationalising maturity in diverse ways, this research identified specific psychological correlates of chronological age and showed how these characteristics impact parenthood. Although older maternal age was positively associated with all three indices of maturity (hardiness, ego resiliency and ego development), it appears that the adaptive self-regulatory aspect of maturity (measured using hardiness and ego resiliency in this research) is more important for adjustment to parenthood than social-cognitive maturity/self-world complexity (as measured by ego development), which was not significantly associated with any individual measure of adjustment considered in the current research. Additionally, the modest size of associations between age and indices of maturity suggest that while older mothers may be more mature, it is not only older mothers who can be mature, and not all older mothers may be mature.

These results also contribute theoretically to further understanding regarding development across the life-span. The significant positive associations between age and all three indices of psychological maturity (and the latent construct of maturity) confirm the possibility of continuing psychological development in adulthood. Although the process by which such development is facilitated was not a focus of the present research, results suggest that certain life experience may contribute to psychological development across the age range of participants in the current research (24 to 43 years). Life-course theory (Elder, 1998) proposes that social trajectories (education, work, family) alter the pattern of the life course, while historically the socially prescribed ages at which certain life events may occur also evolve. In developed countries, it is now more culturally accepted for women to delay parenthood until ‘older’ ages (Billari, et al., 2011). It follows, therefore, that an accumulation of life

experience and knowledge may contribute to women who delay parenthood possessing greater psychological readiness for parenthood (Daly, 2011). Current results showing an association between increasing age and greater psychological resources appear to confirm this, with psychological maturity conferring some adaptive advantages across the transition to motherhood. In contrast to theories of development that suggest childbearing at older ages may prove problematic for adjustment, current findings demonstrate no detrimental age effects in terms of adaptation to motherhood, at least in the socioeconomically advantaged sample of participants in the current research, and show that older maternal age may confer some benefit for parenting in infancy.

While results confirm an association between older maternal age and maturity, they also highlight the importance of specifically examining the psychological correlates of age rather than relying on age as a proxy variable. The effects of maternal age on the range of outcomes examined in this research were largely indirect. Without an explicit examination of psychological maturity and its relations with age and specific outcomes during the transition to motherhood these indirect age effects would have remained obscured (Harker & Thorpe, 1992).

The contribution of age-related psychological maturity to a number of key aspects of adaptation during the transition to parenthood was also established. Women who reported higher levels of psychological maturity experienced more optimal adjustment in pregnancy in terms of greater engagement with the developmental tasks of pregnancy and fewer mental health symptoms. Psychological maturity also predicted more optimal psychosocial adjustment to early motherhood, fewer postnatal mental health symptoms, and more positive perceptions of contextual factors such as maternal and infant health, infant temperament, and partner relationship that also contributed to better postnatal adjustment. In the final observational study when infants were aged 7-

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months, psychological hardiness, assessed in pregnancy, predicted adaptive parenting cognitions regarding efficacy and control, which in turn contributed to greater maternal sensitivity and mind-mindedness in mother-infant interactions.

Current findings largely confirm previously reported associations between variables considered indices of maturity (e.g., ego strength, life adaptation, adaptation competence) and adjustment to parenting (Grossman, Eichler, & Winickoff, 1980; Heinicke, Diskin, Ramsey-Klee, & Given, 1983; Shereshefsky & Yarrow, 1973), and lend further support to the parenting models of Belsky (1984) and Heinicke (1984) in terms of the importance of parental psychological characteristics for adaptation to the parenting role directly, as well indirectly through other contextual factors (partner relationship, social support, infant characteristics) that also impact parenting. The present study extends previous research in three ways. Firstly, relations between age and maturity were an explicit focus; second, prospective associations between adjustment in pregnancy and the postpartum were considered; and third, the study involved a sample in which women considered at the ‘older’ end of the childbearing-age spectrum and those conceiving with fertility treatment were oversampled.

Findings with respect to the importance of psychological maturity for more optimal adaptation during the transition to parenthood have implications for possible interventions in pregnancy for mothers at risk of difficulties adjusting to parenthood. As the adaptive self-regulatory aspect of maturity appears important for both adjustment and parenting, interventions that focus on strengthening adaptation competence, cognitive flexibility, and the use of versatile coping strategies may help counter negative affect in dealing with the normative stresses of caring for a young infant. Hardiness has been shown to be responsive to a training procedure emphasising effective coping, social support, and beneficial self-care that increases hardiness and

reduces ongoing strain (Maddi, 2002; Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011). Similarly, cognitive behavioural interventions focus on challenging negative cognitions relevant to the parenting context including unrealistic expectations, enlisting social support, making time for self-care, and mindfulness practices. Strategies such as these may help expectant mothers, irrespective of age, to develop internal resources, strengthen beliefs regarding parenting efficacy, and put in place adequate external supports to facilitate more optimal adjustment during the transition to parenthood.

This research was also concerned with further examining the impact of older maternal age on adaptation to parenting, given limited and equivocal empirical results to date. Current findings contribute to accumulating evidence that women who become mothers for the first time at an older age do not experience more problematic adjustment compared with their younger counterparts (Berryman, Thorpe, & Windridge, 1995; Carolan, 2005; McMahon, Boivin, Gibson, Fisher, et al., 2011; McMahon, Boivin, Gibson, Hammarberg, et al., 2011; McMahon, Gibson, Allen, & Saunders, 2007; Mercer, 1986; Windridge & Berryman, 1996). Importantly, a wide range of contextual factors that may differ for older women, were also considered. No significant associations between older maternal age and perceptions of a less supportive partner, infant difficulty, or less satisfaction with social support were found, contrary to previous findings that older women report less warmth and satisfaction in their partner relationship (Boivin et al., 2009; Windridge & Berryman, 1996), may perceive their infants as more difficult, and may have more limited support networks (Bornstein, et al., 2006; Harker & Thorpe, 1992).

Furthermore, older maternal age provided a direct benefit for early parenting, with age associated with greater mind-mindedness during mother-infant interactions

even after accounting for the impact of psychological maturity and parenting cognitions. This association was the only direct benefit provided by maternal age in terms of the outcomes examined in this study. However, indirect age associations suggest that older age may provide some benefit through greater psychological maturity and the adaptive advantages maturity provides. Indirect age effects were apparent in respect of a number of variables, including psychological adjustment and mental health in both pregnancy and the early months of parenthood, and parenting behaviours when infants were aged seven months.

By taking into account several possible age-related confounds (health, assisted conception, education), the current research sought to make a further contribution by overcoming some of the limitations of previous studies.

### **Health**

Self-reported pregnancy complications and maternal and infant health were specifically considered given the established associations between older age and poorer obstetric outcomes (Carolan & Frankowska, 2011). Although older women did not report a higher incidence of obstetric complications, they were more likely to experience a caesarean birth, as were women who conceived with medical assistance, who however also reported more complications in pregnancy. Nevertheless, there were no associations between older age or assisted conception and poorer self-reported health in pregnancy, consistent with findings from the larger PATPA sample (Fisher, Wynter, et al., 2013), or at four months after birth, nor in respect of infant health. The reasons behind the higher incidence of caesarean birth in older mothers and those conceiving following fertility treatment were not explored in this study, however rates of caesarean birth in Australia are generally rising and associations between increased rates of caesarean delivery and both older maternal age (Dickinson, 2012; Vaughan, Cleary, &

Murphy, 2014) and assisted conception (Fisher, Hammarberg, et al., 2013; Hammarberg, Fisher, & Rowe, 2008) are well established. Caesarean birth is associated with maternal physical morbidity, a negative impact on the first postnatal contact with the infant and possible adverse effects on breastfeeding capacity and maternal mood (Hammarberg, Fisher, & Rowe, 2008). While mothers may have experienced adverse physical sequelae to caesarean birth in the early postnatal months and difficulties with establishing breastfeeding (Fisher, Hammarberg, et al., 2013), by four months there appeared to be no enduring impact on self-reported maternal health for older women or women conceiving with assistance, nor was caesarean birth associated with the maternal adjustment outcomes considered in the current research.

In fact, maternal age was indirectly related through psychological maturity to reports of better maternal and infant health. The relations between psychological maturity and reports of better health may reflect a protective quality of greater self-regulatory capacities. Previously, Dillon and Totten (1989) reported that older mothers had higher hardiness scores, higher postnatal immunoglobulin levels than younger women, and experienced less upper respiratory tract illnesses in the 2-months after delivery, as did their infants. It is also possible that more mature women adopt protective health practices such as non-smoking, exercise, and self-care. Carolan (2005) observed that older women recognised the importance of health for conception, fetal development, and birth, while childbearing women over age 40 have been found to report a healthy lifestyle (Dickinson, 2012).

It is also important to acknowledge, however, that given the health measures were maternal self-report, it is possible that what is being captured is a perception of better health and wellbeing for more mature mothers. Nevertheless, the significant association between health variables and postnatal adjustment observed in this study is

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consistent with previous findings (Grossman et al., 1980) and, although causal direction is speculative due to health and adjustment being assessed at the same time, underscores the importance of considering health variables in future studies examining adaptation to motherhood.

Although breastfeeding was not specifically considered in the present study, intriguing findings from the larger PATPA sample showed associations between caesarean birth prior to the onset of labour and reduced odds of exclusive breastfeeding at hospital discharge for women who conceived with ART, irrespective of age and despite a clear intention to breastfeed for at least six months (Fisher, Hammarberg, et al., 2013). Interestingly, at four months postpartum ART conceiving women still had reduced odds of exclusive breastfeeding while women aged 37 or older, regardless of mode of conception, had increased odds of exclusive breastfeeding. While the disruption to the establishment of breastfeeding following caesarean birth is thought to result from delayed first contact between mother and infant, or possibly a lack of labour-induced endocrine hormones that assist in the onset of breastfeeding, both would apply equally to older women and women conceiving with ART and yet outcomes appear divergent. Current findings regarding the link between age-related psychological maturity and perceptions of better health advance the possibility that psychological maturity may also contribute in terms of the establishment and continuation of breastfeeding in older mothers, with perhaps greater self-regulatory resources contributing to perseverance with this often difficult task. Disentangling these possible associations in future studies may contribute to a better understanding of ways to improve breastfeeding outcomes for first-time mothers.

### **Fertility Treatment**

One of the most significant correlates of older maternal age is the increased likelihood of needing medical assistance to conceive, yet few studies have considered this when examining the impact of maternal age on adaptation to parenthood. In a novel contribution, all studies considered whether the associations explored in each model examined applied both for women conceiving spontaneously and those conceiving with medical assistance. Findings contribute to a body of research that shows that although women using fertility treatment to conceive may differ on individual indices of adjustment (greater fetal attachment and maternal self-confidence in pregnancy in the current research), overall they adapt to motherhood and parenting in much the same manner as women conceiving spontaneously (Golombok, 2002; Hammarberg, Fisher, & Wynter, 2008; McMahon, Boivin, Gibson, Fisher, et al., 2011; Ross, McQueen, Vigod, & Dennis, 2011). Given that many women requiring assistance to conceive are older, current findings also suggest that age-related psychological maturity may provide some benefits for adjustment. It has been suggested that women conceiving with ART may have idealised and unrealistic expectations of parenthood as a consequence of the experience of infertility and assisted conception, which may render them ‘vulnerable’ when faced with the realities of parenthood (Fisher, Hammarberg, & Baker, 2008; Fisher, Hammarberg, & Baker, 2005). Results of the current research suggest maturity may provide protective benefits in the context of ART conception and its inherent stresses, as well as in countering any emotional distress regarding pregnancy outcome and the stresses of early parenthood. This may reassure those concerned with the possibility of more problematic adjustment in women who conceive following fertility treatment.



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### **Tertiary Education**

Tertiary education was specifically considered in all three studies as older first-time mothers generally have higher levels of education than their younger counterparts. Current findings regarding the impact of tertiary education were somewhat unexpected and warrant further consideration due to participant characteristics. Age and tertiary education were not associated in the current sample due to the majority of participants, both younger and older, having completed a university degree. Tertiary education is considered a potential advantage of parenthood at older ages (Schmidt, et al., 2012) however, contrary to expectations, after accounting for the effects of age and maturity, tertiary education was associated with less optimal self-reported adjustment outcomes in both pregnancy and early parenthood. Compared with women who had not completed a university degree, women with tertiary education reported less engagement with the developmental tasks of pregnancy, less optimal postnatal adjustment, and perceptions of a more difficult infant and a less supportive partner. Tertiary education was also indirectly associated with less optimal postnatal mental health. In contrast, and more consistent with expectations and prior research, tertiary education appeared advantageous for parenting when infants were aged 7-months. Mothers with tertiary education were more sensitive in observed interactions with their infants, even after accounting for the impact of age, psychological maturity, and adaptive parenting cognitions.

These findings are not without precedent. Previous studies have reported associations between higher education and less gratification in the mothering role (Mercer, 1986), and lower evaluations of both early parenting and self-reported capabilities for infant and self-care (Pridham, Lytton, Chang, & Rutledge, 1991). Mercer (1986) speculated that highly educated women may have a high achievement

orientation and therefore less often meet their own expectations, with Pridham et al. (1991) additionally proposing that higher education may result in a more accurate assessment of the realities of early parenthood. Women with a university education may also have a less idealised view of pregnancy and parenthood that contributes to an ability to express negative as well as positive feelings regarding their experience. Another possible explanation is the fact that attaining a university degree is a largely independent pursuit with a fairly controllable outcome. In contrast, caring for a newborn may be perceived as largely uncontrollable and entails a loss of independence. Carolan (2005) reported that older women tended to approach motherhood as a 'project' and one that involved information gathering, preparing, and planning. However, or perhaps because of this, many reported feeling overwhelmed, 'out-of-control', and disempowered by the early months of motherhood, which were variously described as "a nightmare" (p. 771) and "...very boring. I find it anti-intellectual." (p. 772). These observations may be particularly relevant for women who have completed tertiary education.

In addition, with a previous focus on study and career, women with tertiary education may have less caregiving experience and fewer peers with young children from which to obtain realistic expectations regarding infant behaviour and the realities of caring for a young infant. Both maternal self-definition and perceptions of infant behaviour are thought to be directly influenced by experience with children (Moore & Brooks-Gunn, 2002), thus a lack of experience may explain current findings regarding less maternal-self confidence in pregnancy, postnatal perceptions of infants as more 'difficult', and less optimal adjustment in the early postnatal months for women with a university degree.

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Despite the negative associations between tertiary education and adjustment to parenthood, it appears that psychological maturity has a greater impact in terms of benefiting adaptation during the transition to motherhood than the contrary effect of tertiary education when both are considered together. Additionally, self-reported difficulty in adjusting to the early months of motherhood does not appear to detrimentally impact mother-infant interactions assessed a few months later, during which mothers with tertiary education were observed to demonstrate more sensitivity. By this time, infants are further developed and more responsive, women are more established in the maternal role and may feel more capable and effective, and possibly derive greater satisfaction and pleasure from caregiving and their infant (Carolan, 2005). Women with higher education may also understand the importance of appropriate responsiveness for infant development, which may contribute to greater sensitivity.

In summary, current findings make a number of contributions to the parenting literature by empirically confirming an association between older age and greater psychological maturity, establishing the contribution of age-related psychological maturity to a number of key outcomes during the transition to parenthood, and providing further evidence of comparable adaptation to parenthood between younger and older mothers while also accounting for the effects of possible confounding variables.

Current findings, however, also need to be considered in the context of the limitations of the research, discussed next, before the strengths of the study are further elaborated.

### **Limitations and Strengths**

The homogeneity of the volunteer sample of participants, who were predominantly tertiary educated, English-speaking, partnered, worked in professional occupations, and lived in a large city in a developed country may be viewed as the main limitation of this research. This limits the generalizability of findings, especially in relation to younger first-time mothers, women from a non-English speaking background (which can be an index of migrant status in Australia that has associated stresses), and those living in non-urban areas, whose experience is unlikely to be adequately represented by the current sample. Nevertheless, this socio-economic advantage is largely typical of women who delay motherhood and those using assisted conception (Carolan & Frankowska, 2011; Hammarberg, Fisher, & Wynter, 2008; Schmidt, et al., 2012) suggesting results are likely to be an accurate reflection of the experience of many older first-time mothers living in a metropolitan area. Assisted conception in Australia is largely publicly funded making it more affordable than in many other countries. Socio-economic advantage, therefore, is likely to be broadly representative of many women conceiving with ART outside of Australia, further supporting the generalizability of results to these women. Although the homogeneity of the sample may be viewed as a limitation, the largely similar background characteristics of participants suggest that, outside of specific factors that were accounted for in analyses (tertiary education, fertility treatment), the current findings with respect to age and maturity are robust and unlikely to result from confounding demographic factors.

The age range of participants and the fact participants were self-selected are further shortcomings of the study. Although the sampling strategy excluded adolescent mothers and aimed to recruit a cohort of participants in the adult child-bearing age spectrum while oversampling women aged 37 or more, few participants were aged in

their early twenties and the oldest participant was aged 43. An absence of women aged mid- to late 40s may reflect both a possible reluctance on the part of 'older' women to participate in research during what may be classified as a 'risky' pregnancy with possible negative outcome, and also the smaller number of first-time mothers of this age. Nevertheless, approximately a third of participants in each of the three studies were aged between 37 and 43 years. This suggests the experience of first-time motherhood for women who are considered 'older' was adequately represented, although results do not reflect the experience of women considered to be of 'very advanced' maternal age ( $\geq 45$ ). Moreover, the experiences of younger mothers (aged in their early twenties), as well as women who had not completed tertiary education and those from a non-English speaking background were not adequately represented, possibly due to less interest in research participation in younger women and/or insufficient English-language proficiency to complete an extensive questionnaire and telephone interview. Additionally, current findings do not generalize to women conceiving with donor genetic material and women experiencing multiple births. The need for future research reflecting these experiences is discussed later in this chapter.

The fact that many variables were restricted to maternal self-report is also potentially limiting. Definitive conclusions cannot be drawn in respect of health, quality of partner relationship, infant temperament, and adjustment outcomes as these results reflect maternal perceptions, which are possibly subject to favourable self-evaluation and socially desirable responding. However, results are largely in line with expectations and previous findings, and the use of a range of measures of mental health symptoms and psychosocial adaptation, in pregnancy and the early postpartum, suggest that findings are largely reliable. It should be noted additionally that current findings in respect of postnatal mental health were confirmed by results from the larger PATPA

study where diagnostic interviews were employed (McMahon, Boivin, Gibson, Fisher, et al., 2011). Using objective health data from medical records, observational measures of infant characteristics and maternal adjustment, as well as multiple informant measures may help to overcome this limitation in future studies.

Failure to consider additional factors thought to be important for adaptation to parenting is also a limitation of the current study. A woman's developmental background such as attachment history and relationship with her own mother, employment context, and a more extensive assessment of social support network (Belsky, 1984; Bornstein, 2002) would allow a detailed examination of the relative contribution of each of these factors together with the variables considered in the present research. Although many women in the current study were not in paid work at the time of postnatal assessment perhaps mitigating the direct relevance of the employment context at this time, financial and practical considerations regarding returning to work, together with these other contextual factors (social support, previous attachment relationships) not considered in this research may be different for older women and warrant attention in future studies.

Despite these limitations, the current research had a number of strengths, principally the design, methodology, and theoretical basis of the study. The prospective longitudinal design not only enabled an examination of the experience of pregnancy but also facilitated causal speculation in terms of variables in pregnancy that contribute over time to postpartum adjustment and parenting in infancy. Additionally, assessing psychological maturity in pregnancy limited confounding associated with any temporary postnatal adjustment difficulties, and affirmed the predictive importance of largely stable psychological characteristics across the transition to parenthood. The stratified sampling strategy ensured recruitment of adequate numbers of women aged at

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the ‘older’ end of the child-bearing age spectrum and women conceiving following fertility treatment. Given lack of consensus regarding what constitutes an ‘older’ mother, rather than examining differences between age categories, age was treated as a continuous indicator in analyses. This allowed for the examination of linear age associations (Barnes, et al., 2013; Bornstein & Putnick, 2007) and extends previous research that has focused on differences between groups of older and younger mothers.

The comprehensive conceptualisation of psychological maturity was a further strength of the research. Maturity was operationalised taking account of the theoretical delineation of two aspects of psychological maturity, social-cognitive complexity and social-emotional wellbeing (Bauer & McAdams, 2004; King & Hicks, 2006), as well as specific psychological characteristics thought to be important during the transition to parenting such as adaptation competence, impulse control, and perspective taking (Belsky & Barends, 2002; Cohen & Slade, 2000). Structural equation modelling using a latent construct of psychological maturity with three indicators, ego resiliency, hardiness, and ego development, enabled exploration of the commonalities and differences between these measures while establishing that ‘maturity’ (the shared variance of these constructs) was an important contributor to more optimal adjustment during the transition to parenthood. Further, creating latent factors to represent a number of measures of adjustment (maternal adaptation in pregnancy, postnatal psychosocial adjustment, and mental health symptoms) was more parsimonious than considering each aspect in separate analyses.

The use of structural equation modelling was facilitated by the sample size, larger than many studies with a focus on delayed motherhood and a further strength of the current study. It is necessary to acknowledge, however, that the smaller sample for the observational parenting study precluded the use of the latent variable of

psychological maturity, and as such a path analysis was undertaken with only one aspect of psychological maturity (hardiness) considered. Nevertheless, both path analysis and structural equation modelling allowed both direct and indirect effects to be assessed, an important consideration in the current research when age effects were found to be largely indirect and both direct and indirect effects were hypothesised.

As previously noted, examining the impact of tertiary education and maternal health and considering whether associations were invariant for women who conceived spontaneously as well as those conceiving with assistance are strengths of the research and address some of the limitations of previous studies. By considering the effects of potentially confounding factors, results are more likely to reflect genuine associations between the variables of interest rather than differences in contextual characteristics. Additionally, the fact that health and education were associated with maternal adaptation demonstrates the importance of considering these variables in future studies. The use of two observational measures of parenting at 7-months was a further advantage that complemented the use of self-report measures of adjustment in the early months of parenthood. Different coders blind to participant characteristics and study hypotheses assessed sensitivity and mind-mindedness, which may help to overcome some of the shared-method variance arising from parenting behaviours being assessed from the same episode of play. Although the duration of the interaction from which parenting behaviours were assessed was relatively brief (15 minutes), both measures are explicitly designed for use in interactions of this duration, with observational measures such as these regarded as valid indications of likely childrearing behaviour across multiple situations (Belsky & Barends, 2002).

Despite some limitations in terms of sample characteristics and reliance on self-report measures, the overall findings of this research are reassuring for women having a



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first baby at an older age. Although older women may encounter a more complicated conception and obstetric experience, this does not appear to adversely impact psychological adjustment to parenthood and early parenting. Additionally, age-related maturity provides some benefits for adaptation during the transition to parenthood. The following section outlines the ways in which future research may address the shortcomings of the studies presented in this thesis.

### **Future Directions**

A more detailed understanding of the complex interplay of factors involved in the transition to parenthood for women of all ages would be facilitated by studies using alternate methods and taking account of variables not considered in the current research. While the advantages of the large sample and use of structural equation modelling are noted above, the exclusive use of quantitative self-report measures does not adequately capture the lived experience of parenthood for first-time mothers. Future prospective longitudinal research might consider a mixed-methods approach, incorporating qualitative interviews in addition to standardised self-report and multiple-informant measures (e.g., reports from partners, family members, and early childhood nurses), objective health information, and comprehensive measures of adaptation and parenting including observational assessments of infant temperament and maternal caregiving in different situations such as episodes of infant distress. While quantitative methods identify statistically significant associations, qualitative methods provide a richer perception that helps make sense of statistical findings. For example, Carolan's (2005) qualitative study of older mothers provided valuable insights for generation of hypotheses for the present research and for possible interpretations of current results.

As previously noted, more complex models incorporating additional determinants of parenting (occupational context, social network, developmental history)

as well as different conceptualisations of psychological maturity, for example using alternate indices of self-regulation and social-cognitive maturity or other characteristics thought to represent maturity, are also required. Transactional analyses, wherein both infant and parental characteristics and the interaction between the two are implicated in outcomes (Bornstein, 2002), were not considered in the current study and this may be an interesting avenue for future research concerned with the impact of psychological maturity during the transition to parenthood.

Other than women's perceptions regarding the quality of their partner relationship, the role of fathers in adjustment and parenting (Belsky & Jaffee, 2006; Heinicke, 2002) was not examined in this research. Interestingly, fewer studies appear concerned regarding the impact of age in respect of delayed fatherhood despite a number of medical risks associated with childbearing at older paternal age (Schmidt, et al., 2012), and fewer qualitative investigations of fatherhood seem to have been undertaken (e.g., Bracks-Zalloua, McMahon, & Gibson, 2011; Mac Dougall, Beyene, & Nachtigall, 2012). Future studies assessing models that include maternal, paternal, infant, and contextual characteristics and which examine mediating and moderating influences may provide a more comprehensive understanding. Although such research is likely to require a large sample and prove expensive, population data such as that available through the Longitudinal Study of Australian Children (Australian Institute of Family Studies, 2004) may be available for such analyses. Using a broad dataset such as this would also allow longer-term outcomes, including child development in the first decade of life, to be examined.

The timeframe considered in the present study was by necessity constrained to pregnancy and the early months of parenthood. Future prospective studies with a longer-term focus may establish whether psychological maturity associated with older

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maternal age continues to contribute to parenting and child development outcomes in toddlerhood and later childhood. Older mothers may attempt to extend their family in a shorter time-frame than younger mothers, and many may require fertility treatment to achieve this (Wynter et al., 2013). Additionally, the importance of factors such as career and return to work for older women and those with tertiary education and the impact of this on adjustment, parenting and child outcomes provide another interesting focus for future research.

The research reported here explored the transition to parenthood for women childbearing in what might be considered the current ‘normative’ age spectrum (24 to 43 years) in many developed countries, albeit weighted towards a higher than population representation of older mothers. Very few women used donated oocytes or sperm to conceive, and few had multiple births, both more likely in older first-time mothers. The experience of women considered to be of ‘very advanced’ maternal age ( $\geq 45$ ), and those who conceive with donated genetic material may be different to that represented by current findings.

Results from recent studies undertaken in the United Kingdom suggest that achieving parenthood through genetic donation may lead to different longer-term outcomes. For example, Boivin et al. (2009) reported that conception with donated oocytes was associated with higher maternal depressive symptoms some years after childbearing, which the authors suggested may be associated with symptoms due to the onset of menopause in women who become mothers at an older age. Similarly, Golombok and colleagues (Golombok, Blake, Casey, Roman, & Jadvá, 2013) found that children born via surrogacy showed higher levels of adjustment difficulties at age seven. Although the absence of a genetic connection between parents and children does not appear to have an adverse effect on the quality of parent–child relationships or

children's adjustment (Golombok, 2013), the absence of a gestational connection may contribute to greater adjustment problems. Future research that specifically examines these factors in parents of very advanced age, as well as those who conceive with donor sperm, oocytes, embryos, and via surrogacy is therefore warranted, especially in the Australian context where fewer such studies have been undertaken. Additionally, the context of parenting may be different for women giving birth without a partner and for same-sex couples (Golombok & Badger, 2010) and studies that consider these relational contexts and the experience of parenthood for these families are also needed.

The current research did not specifically examine the transition to parenthood for women experiencing multiple births, and adjustment to and the context of parenting is likely to be different for women with two or more babies (Thorpe, Greenwood, & Goodenough, 1995). There is currently limited evidence that suggests multiple birth may be associated with increased risk of postpartum depressive symptoms (Ross, et al., 2011). Although rates of multiple birth following ART in Australia have fallen due to a recent policy of single embryo implantation (Macaldowie, Wang, Chambers, & Sullivan, 2013), multiple gestation occurs spontaneously as well as following treatment for infertility and is also associated with older maternal age (Vohr et al., 2009). Future studies are needed to adequately represent this experience.

The reasons for childbearing at particular ages were not explored in the current research and this is a particularly salient focus for future research, results of which may contribute to a greater understanding of the factors associated with the trend to delay motherhood in Australia, and inform possible public policy responses. Although some studies report that delayed childbearing is often not a conscious choice but the result of factors outside a woman's control such as lack of a suitable partner or infertility (Benzies et al., 2006; Cooke, Mills, & Lavender, 2012; Mac Dougall, et al., 2012), there

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may also be a general lack of awareness of the risks associated with childbearing at older ages. Daly (2011) reported that many otherwise well-educated women demonstrated little understanding of fertility deadlines as well as confusion regarding reproductive technologies and a lack of concern for childbearing at very advanced maternal age outside of the financial ability to provide for a child. The author proposed that this may contribute to many women not discovering the extent of age-related fertility decline and the limited capacities of ART to assist until it is already too late. Indeed, a complementary study could prospectively explore a sample of women who have been unable to conceive a child at an older age, and examine how psychological maturity influences their adaptation to this life goal being thwarted.

Daly's (2011) findings together with the continuing trend for older maternal age at first birth suggest that recent media reports and pejorative public health campaigns depicting older motherhood as risky, unnatural, and self-indulgent (Campbell, 2011; Shaw & Giles, 2009) may not have substantially altered either attitudes or childbearing behaviour. Contributing to greater public awareness through more effective, non-stigmatizing communication of declining biological capacity for childbearing, the limits of reproductive technology to extend fertility, as well as the medical risks associated with parenthood at older ages for mother and child is therefore required (Daly & Bewley, 2013). The provision of objective information regarding the biological and medical implications of conception and childbearing together with the psychosocial advantages and disadvantages of childrearing at various ages for men, women, and infants may contribute to individuals and couples being able to interpret the risks while taking account of the protective factors, perhaps leading to better-informed childbearing choices.

Beyond the perspective of the individual, earlier childbearing may be facilitated by fostering a social, cultural, economic, and political environment in which parenthood is valued and supported, and framed as a societal issue involving men and women rather than a woman's sole responsibility (Frejka, Sobotka, Hoem, & Toulemon, 2008). The provision of publicly funded parental leave of adequate duration and remuneration with a strong emphasis on father involvement in early caregiving, affordable and high-quality childcare and early childhood education, as well as family-friendly workplace policies may help to foster an environment in which both women and men feel better able to combine parenting and paid workforce participation. Such measures are generally lacking in Australia, suggesting that women will continue to largely bear the burden of childbearing and childrearing with the attendant reduction of income, status, and career opportunities that follow, perhaps contributing to a reluctance to embark on motherhood until the biological deadline for childbearing approaches.

## **Conclusions**

The medical perspective emphasising the risks of conception, pregnancy and childbirth for older women necessarily and appropriately focuses on concerns regarding declining fertility, reliance on often unsuccessful fertility treatment to conceive, and increased likelihood of adverse perinatal outcomes for mother and infant (Berryman, et al., 1995; Billari et al., 2011; Daly & Bewley, 2013; Schmidt, et al., 2012). This study does not seek to dismiss these important considerations. However, medical studies often concede that advances in health and medical knowledge have probably contributed to less risk than previously and many older women do experience successful childbearing outcomes (Carolan & Frankowska, 2011; Dickinson, 2012). Given the complex interplay of factors contributing to delayed parenthood and the fact that childbearing at an older age is often due to factors outside a woman's control

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(Cooke, et al., 2012), findings from the current study contrast with the medical perspective by establishing potential psychological advantages associated with childbearing at an older age.

This research sought to examine the psychological characteristics associated with age and explore whether these characteristics provide any benefits for women when they do embark on parenthood at older ages. Results showed an association between older age and greater psychological maturity in pregnancy. Psychological maturity, as conceptualised in this research, involves the ability to adapt flexibly to changing circumstances, regulate negative emotions, tolerate ambivalence, and see another's perspective. Psychological maturity in turn, directly contributed to a more optimal transition to motherhood in terms of:

- Formation of a maternal identity in pregnancy (maternal-fetal attachment, maternal self-confidence, identification with motherhood), which predicted better adaptation in the early postnatal period
- Psychological and social adjustment in the early months of motherhood
- Fewer symptoms of anxiety and depression in pregnancy and the early postpartum
- Perceptions of better health for mother and infant
- Reports of an easier infant and a more supportive partner
- Adaptive beliefs regarding parental influence on child development and the parent-child relationship, with these beliefs contributing to responsive mother-infant interactions when infants were aged 7-months.

Furthermore, older maternal age provided some benefit in terms of the above outcomes but this benefit was indirect and through the relationship between older age and greater psychological maturity. Additionally, results confirm that although older women are

more likely to require medical assistance to conceive, they do not experience a more problematic transition to motherhood.

Current results make a unique contribution by confirming hypothesised relations between older maternal age and adaptive psychological resources, and provide a better understanding of the mechanisms by which age may impact adaptation during the transition to parenthood and parenting in infancy. Psychological maturity rather than age per se impacts important aspects of adaptation during the transition to parenthood, including emotional and psychosocial adjustment in pregnancy and the early postnatal months, and parenting at 7-months. These associations applied regardless of mode of conception. Results are novel in evaluating how variations in the psychological characteristics of a community sample of first-time mothers relate to differences in adaptation and parenting, where previous studies more often focused on clinical outcomes and negative emotionality (Bornstein, Hahn, & Haynes, 2011). Further, the self-regulatory components of psychological maturity can be nurtured thus providing scope for existing antenatal preparatory programs as well as postnatal support services to incorporate elements that foster cognitive flexibility, coping strategies, and recognition of the need for social support and adequate self-care.

Adaptation to parenthood in the early months is important for maternal emotional wellbeing and has longer-term implications for child development (Anhalt, Telzrow, & Brown, 2007; Murray, Cooper, & Hipwell, 2003). The trend towards postponement of first-time motherhood is well established (Schmidt, et al., 2012). Findings from the current study might reassure women that, at least from a psychosocial perspective, greater psychological maturity and the associated benefits it provides may be adaptive in negotiating the challenges of the transition to parenthood for older first-time mothers.



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## Appendices

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## Appendix A: Ethics Approval

**From:** "Fran Thorp" <>  
**To:** <>  
**Date:** 29/11/2007 2:05:29 pm  
**Subject:** ethics amendment

Dear Anna-Lisa

Re: Age at first birth, mode of conception and adjustment to early parenthood (HE23FEB2007-R04994).

Thank you for your amendment request dated 22 November 2007. Your amendment has been approved. This approval applies to the following amendment:

1. Ms Anna-Lisa Camberis will be conducting a research project to meet the requirements of the degree of Doctor of Philosophy (Psychology) within the above project. The project will assess the quality of parenting and parent-child outcomes of a sub-set of participants using an observational measure of mother-infant interaction and an infant developmental assessment. Observational measures will supplement questionnaires being used in the larger study.

Three months after the birth of the baby, mothers will be invited by letter to participate in an optional home visit component of the PATPA (Parental Age and Transition to Parenthood Australia) study in which they are already participating. Parents who consent to the optional home visit will be contacted by telephone to arrange a convenient time for Ms Camberis to visit the home. The visit will take approximately 1 hour. Participants will be provided with an information booklet about child development at the home visit. After the visit participants will be provided with a DVD or video copy of the play session, a brief report providing feedback on the infant assessment and a letter thanking them for their participation.

Participants who do not respond to the letter will be contacted at 4 months postnatal as per the main study's protocol to complete the telephone interview and questionnaire.

2. The following measures will be used:

- (a) Developmental assessment of the infant using the Bayley Scales of Infant and Toddler Development - Third Edition.,
- (b) A 15 minute session of free play between mother and infant which will be video-taped for subsequent coding of mother-infant interactional behaviours.
- (c) The mother will be asked to complete the Maternal Self-efficacy Scale

Regards

Fran

Ms Frances Thorp  
Research Ethics Officer

Research Office  
Level 3, Research HUB, Building C5C  
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NSW 2109

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e:  
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**CC:** < > "  
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**Appendix B: Acceptance of manuscript from *Developmental Psychology***

**From:**

**Date:** 21 May 2014 6:56:16 am AEST

**To:**

**Cc:**

**Subject: Manuscript 2013-2210-RRR Decision**

Dear Dr. McMahon:

Thank you for submitting your manuscript, *Age Psychological Maturity and the Transition to Motherhood Among English-speaking Australian Women in a Metropolitan Area*, manuscript number 2013-2210-RRR, to Developmental Psychology. I find your responses to the previous critiques to be satisfactory. Therefore, I am happy to inform you that the manuscript has been tentatively accepted for publication, pending your completion of the necessary author forms. Please note that we must be in receipt of signed, original author forms prior to formal acceptance of the manuscript. Please download the forms at APA's Author's Corner at: <http://www.apa.org/journals/authors/>.

Return the signed hard copies either via postal mail to the Editorial Office at the University of Michigan: Developmental Psychology, PO Box 1248, 426 Thompson Street, Ann Arbor, MI 48106-1248, USA or scan them and send them as attachments to . Please also note that you must provide an electronic unblinded copy of your manuscript with your forms in either Word or RTF format.

Thank you for submitting your work to us, and congratulations on a valuable contribution to the literature.

Sincerely,

Bert Hayslip, Jr.

Associate Editor, Developmental Psychology

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