MATERNAL AGE AND POSTPARTUM DEPRESSION DURING THE TRANSITION TO PARENTHOOD

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by

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CHAPTER ONE

INTRODUCTION

Major life events and role transitions have traditionally been considered sources of stress, necessitating adjustment on the part of the individual experiencing the life event or transition (Aneshensel 1992; Thoits 1983; Turner, Wheaton, and Lloyd 1995; Wheaton 1990). For example, previous research indicates that the loss of roles in the domains of marriage (Simon and Marcussen 1999; Wade and Pevalin 2004) and employment (Hergenrather, Zeglin, McGuire-Kuletz, and Rhodes 2015; Steele, French, and Bartley 2013) is associated with decreased psychological well-being. However, research also indicates that experiencing these events or transitions can affect individuals differently, resulting in variation in the mental health consequences of major life events and directing attention to the contextual factors that can condition the psychological impact of a role transition or major life event (Wheaton 1990).

Despite inconsistency in the existing literature regarding the relationship between mental health and parenthood (e.g., Evenson and Simon 2005), the transition to parenthood is generally considered to be a stressful and challenging period for most individuals (e.g., Cowan and Cowan 1995). Accordingly, this transition can serve as a source of psychological distress for new parents (e.g., Doss, Cicila, Hsueh, Morrison, and Carhart 2014). To that end, the mental health outcome of postpartum depression has recently received empirical attention from researchers studying the impact of this transition.
Postpartum depression (PPD) is characterized as an episode of Major Depressive Disorder (MDD) that onsets during pregnancy or within four weeks after giving birth (American Psychiatric Association 2013). PPD is a serious and pervasive mental health disorder. With respect to prevalence, recent estimates suggest that 9-16% of U.S. women experience PPD (American Psychological Association 2008). The effects of PPD are far reaching, as studies have documented a range of adverse short-term and long-term consequences for families experiencing this disorder (e.g., Beck 1998). Given this, increased investigation into the antecedents of this disorder is clearly warranted.

One potential risk factor that has been examined within the transition to parenthood research is maternal age at first birth. As will be detailed in the following chapters, maternal age is of particular significance in research that seeks to better understand the mental health effects of this transition on account of the trend of delaying entry into motherhood for U.S. women observed over the previous decades (National Vital Statistics System 2015). However, the existing literature concerning the relationship between maternal age and PPD has been somewhat mixed. For example, previous research suggests that younger parents are at increased risk for PPD (Katon, Russo, and Gavin 2014), older parents are at increased risk for PPD (Boivin et al. 2009), there is a curvilinear relationship between age and PPD (e.g., Mirowsky and Ross 2002), and finally, age is not a significant predictor of PPD (e.g., McMahon, Boivin, Gibson, Hammarberg, Wynter, and Fisher 2015).

In this dissertation project, I revisit the relationship between maternal age and PPD focusing on structural, cultural, and social psychological factors that might help explain variation in mental health outcomes during the transition to parenthood. I add to the literature concerning the relationship between maternal age and postpartum depression in two important ways. First,
because much of the existing work on this topic is comprised of retrospective accounts, this research extends the literature by examining maternal mental health as assessed during the critical postpartum period in a national sample of U.S. women. Second, this research draws on two dominant sociological models of health and mental health to elucidate the structural factors (socioeconomic status and role occupancy), cultural factors (perceptions regarding the timing of the pregnancy), and proximal factors (social support and perceived control during the childbirth process) that contribute to the relationship between maternal age and postpartum depressive symptomatology. Specifically, I use the frameworks of life-course theory and social structure and personality (SSP) to guide my examination of these factors.

The life-course perspective focuses on explaining the relationships between social roles, role transitions, and well-being in the context of historical time and place (Elder, George, and Shanahan 1996). This perspective does not present as a unified theory of the life course, but is rather best used to supplement and extend other theories (George 2013). Nonetheless, there are a number of core principles shared by this perspective. These core principles concern historical time and place, the timing of lives, linked lives, human agency, and life span development (Elder, Kirkpatrick Johnson, and Crosnoe 2003). By drawing attention to the importance of embeddedness, process, culture, and context (Elder, George, and Shanahan 1996), this perspective provides a framework within which to better understand the mental health consequences of entry into such major life roles as parenthood and of role sequencing. For example, experiencing major role transitions in a non-normative or disordered fashion has been linked to adverse outcomes for individuals (Hogan 1978). Recently, researchers have argued for a more nuanced view of the consequences of experiencing non-normative transitions, with the consequences of these transitions conditioned by the social and psychological resources and
responses of the individual (Furstenberg 2005) and influenced by such stratification variables as socioeconomic status (Jackson 2004; MacMillan and Copher 2005).

The social structure and personality (SSP) framework is centered on the examination of the impact of macrosocial conditions on individual outcomes (House 1977). Though this examination is a key aim of sociological research in general, SSP work is distinguished by its emphasis on the psychological processes that link the macro-social to the micro-social, as well as its grounding in three orienting principles: the components principle, the proximity principle, and the psychological principle (House 1981). Within the components principles, consideration is directed to both the structural and cultural factors that can influence behavior (Schnittker 2013). More specifically, social structure is conceptualized as individual locations within hierarchies, and focuses on the processes by which social structure shapes opportunities, which then condition life chances (McLeod and Lively 2006). SSP researchers also emphasize the role of culture, examining the processes by which patterned behaviors are due to the transmission of values and beliefs via socialization (McLeod and Lively 2006). The second SSP principle, the proximity principle, is concerned with the impact of macro-social processes on individual experiences, and suggests that individuals experience social structure primarily through micro-interactions that occur in such proximal environments as dyads, small groups, and formal organizations. The third principle of the SSP framework, the psychological principle, highlights the importance of understanding how individuals perceive, process, and attribute meaning to the macro-structure and to their experiences.

Taken together, the life-course and SSP frameworks suggest a number of factors that might impact the relationship between maternal age and postpartum distress. Moreover, the concurrent application of the life-course and SSP frameworks is consistent with recent
suggestions regarding the empirical value of incorporating concepts from the life-course perspective into SSP research (McLeod and Lively 2006), and incorporating concepts from SSP into life-course research (George 1996). As suggested by these frameworks, there are three sets of factors that will be examined in this dissertation. The first set includes structural factors related to one’s socioeconomic position, resources, and role occupancy, such as level of education, household income, employment status, and marital status. The second set centers on the cultural factor of perceptions regarding the timing of the pregnancy. The third set includes such proximal factors as social support and perceived control during the childbirth process. Exploring three sets of factors will not only help to elucidate the association between maternal age and postpartum distress, but will also allow for the examination of whether age in combination with these other factors helps to explain the distribution of maternal distress during the postpartum period.

To examine these relationships, I analyze data from a national survey on motherhood, *Listening to Mothers II: Second National U.S. Survey of Women’s Childbearing Experiences* (LTMII) (Childbirth Connection 2006). The LTMII data set is ideal for the aims of this research for several reasons. First, LTMII is part of a series of landmark data collection efforts focused on the population of new mothers. Specifically, the *Listening to Mothers I* survey, conducted in 2002, was the “first national United States survey of women’s maternity experiences” and as such, this survey offered an “unprecedented opportunity” to examine the transition to parenthood experiences of new mothers in the US (Declercq, Sakala, Corry, and Applebaum 2006:2). The LTMII builds upon the initial survey, including not only many of the original items, but also new content (Declercq, Sakala, Corry, and Applebaum 2006). Therefore, this data set provides me with an opportunity to examine the experiences of new mothers, a population that is traditionally
difficult to access; this advantage is further emphasized given that much of the previous work focusing on maternal age and depression has been comprised of retrospective accounts.

Additionally, the LTMII sample is comparable to the population of U.S. who gave birth in 2005 (Declercq, Sakala, Corry, and Applebaum 2006), and there is sufficient variation among the ages of the women in this sample to allow for an examination of my key theoretical relationship.

This dissertation is organized into five chapters. Chapter 1 (the present chapter) provides an introductory overview of the key concepts examined in this research. In Chapter 2, I review the existing literature regarding the relationship between maternal age and postpartum depression. Chapter 2 also includes discussion of the two theoretical perspectives I use in this research, life-course theory and the SSP framework, as well as the theoretical model suggested by these perspectives. Chapter 3 provides a discussion of the methodological approach used in my analyses. This discussion includes a description of the data set, sample, variable measurement, and my analytic strategy. In Chapter 4, I present the results of three phases of data analysis. The final chapter (Chapter 5) offers a summary of my findings, as well as discussion concerning the theoretical contributions and implications of my research, the limitations of this study, and directions for future research in this area.
CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

In this chapter I review the existing literature in this substantive area and present discussion of the theoretical frameworks that guide this examination. I first discuss previous research concerning the transition to parenthood, postpartum depression, the role of maternal age during the transition to parenthood, and the relationship between maternal age and postpartum depression. Second, I provide an overview of the theoretical perspectives used in this research (life-course theory and the SSP framework), focusing specifically on the relationship between role transitions and health outcomes. Third, I combine insights from these perspectives to delineate the structural, cultural, and proximal factors that may serve to condition the relationship between maternal age and postpartum depression. I then present my proposed theoretical model as suggested by previous research. This chapter concludes with an outline of my research questions and hypotheses.

The Transition to Parenthood

From the sociological perspective, major life events and role transitions have traditionally been considered sources of stress, necessitating adjustment on the part of the individual (Aneshensel 1992; Kessler 1979; Thoits 1983; Turner, Wheaton, and Lloyd 1995; Wheaton
Research also indicates that experiencing a major life event or a significant role transition can affect individuals differentially, resulting in much variation in the mental health consequences of major life events (Wheaton 1990). In accordance with this finding, previous investigations examining the mental health consequences of parenthood throughout the life course have been largely inconsistent (e.g., Evenson and Simon 2005; Nomaguchi and Milkie 2003). For example, previous research suggests both a positive association (Kandel, Davies, and Raveis 1985) and a negative association (Glenn and McLanahan 1981, 1982; Hughes 1989) between being a parent and psychological well-being. Additionally, research indicates that there are both costs and rewards associated with parenthood, with these costs (such as depression) and rewards (such as social integration) being conditional on an individual’s social positioning with respect to marital status and gender (Nomaguchi and Milkie 2003).

Despite the inconsistency in the existing literature concerning the relationship between parenthood and mental health, researchers typically conceptualize the transition to parenthood as a stressful time wherein parents are presented with a range of new challenges (Doss, Cicila, Hsueh, Morrison and Carhart 2014). To illustrate, Cowan and Cowan (1995: 412) describe the transition to parenthood as a period in which “new challenges can outstrip existing resources, trigger new problems, or amplify pre-existing vulnerabilities and inadequacies.”

Given this, the transition to parenthood has been associated with a number of adverse changes in the domains of work and family life, such as increased marital conflict and decreased marital satisfaction (Cowan et al., 1985; White and Booth 1985) and challenges associated with adjusting to (and balancing) new roles (Cast 2004; Feldman and Nash 1984; Morse, Buist, and Durkin 2000). For example, parents must navigate the new challenge of dividing the childcare labor, with violated expectations in this area linked to mental health consequences postpartum
(Biehle and Mickelson 2012). With respect to the parenthood transition serving as a source of psychological distress, the outcome of postpartum depression has recently received significant empirical attention from researchers in this area.

Postpartum Depression

Postpartum depression (PPD) is one of three postpartum mood disorders, along with postpartum blues and postpartum psychosis (Seyfried and Marcus 2003). No standard criteria currently exists for measuring or diagnosing postpartum blues, but researchers estimate that this transient mood disturbance, characterized by such symptoms as tearfulness, mood liability, and irritability, is the most common of the postpartum mood disorders and is experienced by 30-75% of new mothers (Seyfried and Marcus 2003). The least common postpartum mood disorder, postpartum psychosis, affects between 1-2 women per 1000 births (Seyfried and Marcus 2003); diagnostic criteria for this disorder includes the existence of a manic or psychotic episode associated with childbirth (Doucet, Dennis, Letourneau, and Blackmore 2009).

Postpartum depression (PPD), the postpartum mood disorder that is the primary focus of this research, is characterized as an episode of Major Depressive Disorder (MDD) that onsets during pregnancy or within four weeks after giving birth (American Psychiatric Association 2013). In other words, the symptoms associated with PPD are consistent with those of Major Depressive Disorder with the primary distinction being that these symptoms are experienced during the postpartum period. Such symptoms include depressed mood, feelings of sadness, emptiness, hopelessness, worthlessness, or guilt, fatigue and loss of energy, decreased interest in activities, and a diminished ability for decision making and concentration (American Psychiatric Association 2013).
PPD is a serious and pervasive mental health disorder. Symptoms of this disorder can also include disinterest in one’s baby or other family members, excessive anger or irritability, and experiencing harmful ideations toward oneself or the baby (American Psychological Association 2008). With respect to prevalence, recent estimates suggest that between 9-16% U.S. experience PPD (American Psychological Association 2008). Moreover, half of the women diagnosed with PPD report that this is their first episode of depression (American Psychological Association 2008).

The effects of PPD are far reaching, as studies have documented the detrimental short-term and long-term consequences that maternal depression can have on the children of women experiencing this disorder. In terms of short-term consequences, researchers have demonstrated that maternal depression can negatively influence maternal-infant interaction patterns, resulting in numerous adverse child development outcomes (Beck 1998). Infants of depressed mothers have also been found to exhibit lower social engagement, more negative emotionality, and higher stress reactivity than infants of non-depressed mothers (Feldman, Granat, Pariente, Kanety, Kuint, and Gilboa-Schechtman 2009). With respect to long-term consequences, maternal depression has been linked with delayed child growth (Surkan, Kawachi, Ryan, Berkman, Carvalho Vieira, and Peterson 2008), and such developmental issues as child behavioral problems and lower child cognitive functioning (Beck 1998). Further, in an examination of the time investments of mothers with 5-year old children concerning four activities (taking their child on outings, taking trips to playgrounds or parks, playing indoors with the child, and time spent reading with the child), Frech and Kimbro (2011) found that maternal depression is associated with lower time investments in all four activities.
As demonstrated by this line of research, and as underscored by the high prevalence rates of PPD, increased investigation into the antecedents of this disorder is warranted. This dissertation research focuses on the processes by which a key variable, maternal age at first birth, contributes to depression in the postpartum period.

*The Role of Maternal Age in the Transition to Parenthood*

Maternal age is of particular significance in research that seeks to better understand the mental health effects of the transition to parenthood given the trend of delaying entry into motherhood for U.S. women observed over the previous decades. For example, the average age of first-time mothers in 1970 was 21.4 years old; the average age had increased to 25.0 years old by 1990 (National Center for Health Statistics 2009). By 2013, the mean age of first-time mothers had further increased to 26.0 years old (National Vital Statistics System 2015).

Using data from the National Center for Health Statistics, researchers have also examined this trend in the context of different age groups. Comparing data from 1990 and 2008, researchers from the Pew Research Center (2010) found that birth rates increased for all women ages 30 and older, with the sharpest rate increases observed for women in the oldest age groups. For example, in 1990, 13% of births in the United States were to women under 20 years old, 75% of births were to women between 20-34 years old, and 9% of births were to women 35 years of age and older. By 2008, the proportion of births to women younger than 20 years old had decreased to 9%, whereas the proportion of births to women 35 years and older had increased to 14% of all births (Livingston and Cohn 2010). In sum, recent estimates indicate that pregnancy at older ages is becoming increasingly common for U.S. women.
In terms of why this trend matters, previous research indicates that older parents differ from younger parents on a range of demographic characteristics (Pew Research Center 2010). For example, in a longitudinal study that compared the characteristics of delayed childbearing couples (defined as mothers older than 28 years old) with the characteristics of normative childbearing couples (defined as mothers younger than 28 years old), Roosa (1988) found significant differences in levels of education and income between the couples. Importantly, such demographic characteristics have been consistently linked to variation in health status (Marmot 2004; Wilkinson 2005; Link and Phelan 1995).

In studies examining mental health outcomes among general adult populations, age has also been associated with a number of predictors of psychological well-being, such as self-esteem (Robins, Trzesniewski, Tracy, Gosling, and Potter 2002; Orth, Trzesniewski, and Robins 2010) and mastery (Ben-Zur 2002; Mirowsky 1995; Schieman and Turner 1998). However, while age is often included as a covariate in postpartum depression research, it rarely appears as the focal variable in these studies. Given the relationships between age, demographic characteristics, and mental health, the question remains: are younger parents more or less likely to experience postpartum depression relative to their older counterparts? And importantly, what are the mechanisms that help to explain the association between maternal age at first birth and postpartum mental health?

Findings within the existing literature have been somewhat inconclusive with respect to the relationship between maternal age and distress, particularly in terms of the likelihood of experiencing depressive symptoms as an older mother (McMahon, Boivin, Gibson, Hammarberg, Wynter, and Fisher 2015). In what follows I review examples from the existing
literature that have supported a significant relationship between maternal age and distress, as well as empirical works that have not found evidence to support this association.

*Maternal Age and Postpartum Depression*

In general, mental health scholars have found age and depression to be best represented as a curvilinear relationship, which suggests that the age range in which individuals hold a number of primary social roles (e.g., employed, parent, spouse) is associated with the least amount of distress (Mirowsky and Ross 1992). This parabolic relationship has also been found with respect to age and maternal depression (Carlson 2011). For example, Mirowsky and Ross (2002) found that mother’s age at first birth predicted current depressive symptoms, with the optimal age for women to enter parenthood (in terms of the least amount of distress) to be 30 years old.

Additional research conducted in this area supports a significant association between age and maternal distress. A number of recent analyses have found younger age to be a significant risk factor for the development of PPD (Katon, Russo, and Gavin 2014; Wang, Tiejian, Anderson, and Florence 2011). However, other researchers have found evidence to suggest that transitioning to parenthood at older ages is linked with PPD. In one example of this work, Boivin et al. (2009) examined the impact of maternal age at first birth on a number of parental outcomes, including current emotional well-being. Couples included in this study were recruited from those that had a live birth at twenty UK fertility clinics between 1994-2002, and were categorized into three groups based on the age of the mother at delivery: younger (less than 31 years old), middle (between the ages of 31 years old and 38 years old), and older (older than 38 years old) (Boivin et al. 2009). Results from this investigation indicate that mothers in the
“older” age group reported significantly more current depressive symptoms than those women in the “younger” age group; this association remained significant when controlling for maternal education and income, but diminished to non-significance when controlling for such relational factors as relationship length (Boivin et al. 2009). Significant differences between mothers in the three age categories on such demographic variables as years of education and family income was also observed (Boivin et al. 2009).

In contrast to the lines of research discussed above, other empirical works have not found evidence in support of the association between maternal age and distress. As part of the Parental Age and Transition to Parenthood Study Australia (PATPA) program, McMahon and colleagues (2015) examined the experiences of new mothers in Australia, finding that maternal age did not predict the timing or prevalence of major depressive episodes during the postpartum period. In a sample of new mothers in the United Kingdom, Windridge and Berryman (1999) also found that women over the age of 35 years old were no more likely to report postpartum depressive symptoms than mothers aged 20-29 years old. Further, in qualitative interviews with first-time mothers over 35 years old, Carolan (2005:782) found that by six to eight months postpartum, the respondents in this study were “overwhelmingly positive about their mothering roles and did not display the high rates of postpartum depression frequently associated with older mothering.” In fact, Carolan (2005) found that these respondents attributed their positive experiences with motherhood to the patience and maturity they believed had developed with age.

Maternal age at first birth also served as a key variable in Frech and Damaske’s (2012) examination of the relationships between mothers’ work pathways and physical and mental health status using data derived from the National Longitudinal Survey of Youth (NLSY). Respondents in this research included mothers who had their first child between 1976 and 1995,
with physical and mental health status assessed when these women turned 40 years of age (between the years 1998-2006). Frech and Damaske (2012) found mothers’ age at first birth to matter more consistently for physical health than mental health. Specifically, Frech and Damaske (2012) found support for the cumulative advantages and disadvantages of different work pathways on the health of mothers.

There are a number of potential explanations to account for the inconsistency in the existing literature concerning the relationship between maternal age and distress. Because new mothers are a relatively difficult population to access, they remain an understudied population within the social sciences, and this is particularly the case for women who enter motherhood at older ages (Carolan 2005; McMahon et al. 2015). An additional difficulty in advancing comparisons across studies concerns the shifting conceptualization regarding who is considered an “older” mother (McMahon et al. 2015). For instance, at the time of the publication of Roosa’s (1988) research, a “delayed childbearer” was operationalized as a mother older than 28 years of age; in the more recent research of Boivin et al. (2009), an “older” mother was defined as one 38 years of age and older.

Furthermore, much of the existing work on this topic has been comprised of retrospective accounts. Although investigations such as Mirowsky and Ross (2002) and Carlson (2011) are useful toward clarifying the general relationship between age at first birth and maternal mental health, many of the studies conducted in this area do not include distress assessments as measured during the critical postpartum period. For example, the average age of the child at the time of data collection across all three age groups in the Boivin et al. (2009) study was nearly 7 years old; similarly, because Frech and Damaske (2012) were primarily interested in examining the trajectories of work pathways, mothers’ health status was assessed 12 years following the
birth of the child. Given the challenges and stressors associated with the transition to parenthood period (e.g., Cowan and Cowan 1995; Doss, Cicila, Hsueh, Morrison and Carhart 2014), capturing women’s experiences as they undergo this transition can provide researchers with valuable insight regarding the antecedents of PPD and ultimately, can serve to inform the development of interventions designed to assist families experiencing this disorder.

The association between maternal age and postpartum mental health has also been explored by researchers using the Listening to Mothers II data set. In Beck, Gable, Sakala, and Declercq’s (2011) examination of postpartum depression rates among the LTMII respondents, maternal age was not associated with PPD. However, Beck and colleagues (2011) analyzed the experiences of both primiparous (i.e., first-time) and multiparous mothers; it is possible that the inclusion of multiparous mothers obscured important trends in the data. As such, examining the influence of maternal age on the postpartum mental health experiences of women transitioning to motherhood for the first time is an important avenue awaiting additional investigation.

To that end, in this dissertation project, I add to the literature concerning the relationship between maternal age at first birth and PPD in two important ways. First, because much of the existing work on this topic is comprised of retrospective accounts, this research extends the literature by examining maternal mental health as assessed during the critical postpartum period in a national sample of U.S. women. Second, this research draws on two dominant sociological models of health and mental health to elucidate the structural, cultural, and proximal factors that contribute to the relationship between maternal age and postpartum depressive symptomatology. Specifically, I use the life-course and SSP frameworks to guide my examination of these factors.
**The Life-Course Framework**

The life-course framework developed in response to the argument that existing perspectives used to study social pathways, such as the career model and life cycle theory, are unable to capture the full complexity of the life course (Elder 1998). For example, by focusing on the work pathways of individuals, the career model is limited in terms of accounting for other important roles held by an individual, with this limitation becoming particularly apparent following U.S. women’s (mothers) mass entry into the paid labor force in the middle of the 20th century (Elder 1998). Life cycle theory, focusing on the sequencing of social roles (e.g., the cycle of entering parenthood, raising one’s child, the child entering adulthood) also presented with limitations in terms of placing individuals into historical time and place (Elder 1998). In other words, by failing to locate individuals in history, these earlier perspectives were insufficient to capture the complex dynamics of the life course (Elder 1998).

To that end, life-course theory proposes a more contextualized approach by examining social pathways as “lives in motion”, with empirical attention directed to “time, process, and context” (Elder 1998: 7, 5). Accordingly, theorists oriented from the life-course framework conceptualize the life course as a social structure which represents “age-graded life patterns embedded in social institutions and subject to historical change” (Elder and O’Rand 1995: 453).

As outlined by Elder (1994; 1998), the life-course perspective is built upon several fundamental principles. The first of these principles is *historical time and place*. This principle addresses the limitations of earlier theories by recognizing that individuals are embedded within particular historical times and places. In other words, individuals experience the social world differently dependent on the historical time and place into which they were born. The second principle is *timing of lives*, which suggests that role transitions have differential developmental
ramifications dependent on when the transitions occur. For example, entering marriage at a young age can result in a number of cumulative disadvantages throughout the life course via its impact on subsequent role transitions, such as entering parenthood and entering the paid labor force (Elder 1998). Recent research has directed attention to a number of dimensions of long-term temporal patterns in addition to timing, such as critical periods, length of exposure, duration dependence, sequencing, and milestones or turning points (George 2013).

The third central principle of the life-course perspective is *linked lives or interdependent lives*, which highlights how one’s life is interlinked with the lives of others. Stated another way, this principle suggests that our social world is characterized as a series of dynamic and interconnected relationships among its members (Elder 1998). The fourth central principle concerns *human agency*, which recognizes that individuals actively make life choices and work to construct meanings of their life experiences (Elder 1998). An additional principle is added in later work: (5) *life span development*, which indicates that developmental change occurs throughout the entire life course (Elder, Kirkpatrick Johnson, and Crosnoe 2003). Taken together, these principles highlight the emphasis on history, culture, embeddedness, process, culture, and context (Elder, George, and Shanahan 1996).

Although this framework does not present as a unified theory of the life course, insights from this perspective can be fruitfully applied to supplement and extend other theories (George 2013). For example, life-course principles have been applied to a range of issues within the sociology of mental health, including the examination of the relationship between age and mental health outcomes (Ferraro and Wilkinson 2013). The life-course perspective also has much utility toward enhancing our understanding of the factors that serve to influence the mental health consequences of experiencing major life transitions (George 2013). For instance, researchers
have used principles from the life-course framework to examine such topics as transitions into and out of marriage and parenthood (George 1999), cumulative adversity (Turner and Lloyd 1995), the short and long-term impact of life transitions for individuals located across a range of social/familial configurations (McLeod and Shanahan 1993; Aseltine 1996), and the life course trajectories of individuals suffering from mental health problems (Ensel and Lin 1991; Miech and Shanahan 2000).

Several of these life-course principles are relevant to my dissertation research. The principle of linked lives draws attention to how the social networks in which individuals are embedded can impact a variety of sociological outcomes, such as psychological well-being (George 2013). As related to my research, this principle suggests that it would be useful to examine the processes by which a new mother’s level of social support shapes mental health adjustment in the postpartum period. The human agency principle is also applicable to my research. According to Elder and colleagues (2003: 13), the concept of agency entails the “planning and choice-making of individuals...within the opportunities and constraints of history and social circumstance.” With respect to the relationship between maternal age and postpartum depression, the agency principle suggests that the extent to which new mothers are able to exercise agentic action (such as their level of perceived control during the childbirth process) may also serve to influence mental health adjustment during the transition to parenthood.

Of particular relevance to my research, and any work focusing on the influence of age during major role transitions, is the timing of lives principle. According to George (2013: 587), the assumption underlying the concept of timing is that “specific events, experiences, and environments will have different effects, depending on the age in which they occur.” Closely related to the principle of timing of lives is that of sequencing. Broadly speaking, the social role
model examines the consequences of individuals transitioning into and out of social roles across time (Jackson 2004). An important consideration within this line of research is the sequencing, or timing, of these social roles, and of how this ordering impacts the economic and psychosocial resources conferred by occupancy in a particular social role. As such, both the timing of lives and sequencing principles suggest the theoretical importance of age during major life transitions. The following section details the previous research that has been conducted on this topic.

*The Life-Course Framework, Role Transitions, and Health Outcomes*

As proposed by the normative order hypothesis, transitioning into different social roles (such as worker, spouse, or parent) will confer different benefits and losses dependent on the order in which these roles are occupied (Jackson 2004). Experiencing these transitions in a non-normative or disordered fashion has traditionally been linked to adverse outcomes for individuals (Hogan 1978). For example, the normative order hypothesis predicts that individuals following the normative role sequencing of entering the paid labor force, entering marriage, and then transitioning to parenthood will be better adjusted than their counterparts who occupy these roles in a different (i.e., non-normative) sequence.

Life-course researchers have recently argued for a more nuanced view of the consequences of experiencing non-normative transitions, with the consequences of these transitions conditioned by the social and psychological resources and responses of the individual (Furstenberg 2005). For instance, drawing on social support resources during a non-normative transition has been found to moderate the negative consequences of this transition (Furstenberg 2005). Further, researchers have highlighted the processes by which the impact of role transition timing can differ for individuals based on such stratification variables as race and socioeconomic
status (East 1998; George 1996; Jackson 2004; MacMillan and Copher 2005). Therefore, when attempting to understand the influence of age on role transitions, life-course research demonstrates that it is important to examine age beyond its function as a demographic variable; age should instead be considered within the context of other factors, such as social support and socioeconomic status, which can also shape the impact of experiencing a major life transition.

The Social Structure and Personality Framework

The second theoretical perspective that informs my dissertation research is the social structure and personality framework (SSP). As previously noted, researchers have consistently found that older parents differ from younger parents in terms of demographic characteristics (Boivin et al., 2009; Roosa 1998) and that health can vary based on these demographic characteristics (Marmot 2004; Wilkinson 2005; Link and Phelan 1995). Given this, the conceptual framework of SSP, which places empirical emphasis on the impact of macrosocial conditions on individual outcomes (House 1977), lends itself to an examination of the influence of macro-structural variables on the relationship between maternal age and postpartum distress.

In a classic work within this theoretical tradition, Goode (1960) conceptualized social structure and institutions as composed of networks of role relationships. In this conceptualization, one’s set of role relationships is unique to the individual and the degree to which this individual can manage the strains associated with these role relationships is conditional on structural elements (Goode 1960). Social structure was further conceptualized by House (1981: 542) as “a persisting and bounded pattern of social relationships (or pattern of behavioral intention) among the units (persons or positions) in a social system.” Personality is broadly defined by SSP researchers as “stable and persisting psychological attributes” (House
1981: 527), and can be conceptualized in a number of ways, including psychological and emotional states, perceptions, and attitudes (McLeod and Lively 2006). As such, SSP provides a framework for understanding the linkages between macro-level and micro-level processes.

For example, Kohn (1969) directed attention to the processes by which social structure and social class shape values and orientations in such domains as parenting, work, and self-direction/conformity, with particular emphasis placed on the level of control that one exercises within these domains. Kohn (1989) expands on this perspective in a later work, arguing that sociologists can make a distinct contribution by elucidating the macro-scale processes that operate to condition the personalities and life chances of individuals. In addition to personality, research within this theoretical tradition has expanded to include consideration to a range of behavioral outcomes (e.g., crime) and indicators of functioning (e.g., health states) (McLeod and Lively 2006).

Though the examination of the consequences of social forces is a key aim of sociological research in general, contemporary SSP work is distinguished by its emphasis on the psychological processes that link the macro-social to the micro-social, as well as its grounding in three orienting principles: the components principle, the proximity principle, and the psychological principle (House 1981). The first of these principles, the components principle, “directs researchers to identify those aspects of the social system that are most relevant to understanding the process of interest” (McLeod and Lively 2006:81). Within this principle, social structure is conceptualized as individual locations within hierarchies, and draws attention to the processes by which social structure shapes opportunities which then condition life chances (McLeod and Lively 2006). This principle also encourages researchers to recognize the many structural factors that can operate to exert influence on an individual (Schnittker 2013). For
example, an examination of one aspect of social structure, socioeconomic stratification, might be operationalized as individuals’ level of income, level of education, and level of occupational prestige (McLeod and Lively 2006). Although SES is the primary means by which social structure manifests, age also serves as a “major axis of stratification” in that structural influences vary by age; for instance, the structural forces that influence young children differ from those structural forces that influence older adults (House and Mortimer 1990:74).

Notably, SSP researchers have sought to avoid reifying the social structure in a way that dismisses the role of human agency or fails to recognize that stratification systems “often depend on mutually reinforcing structures that are not easily disentangled” (McLeod and Lively 2006: 81). To that end, the influence of culture is an important consideration within the SSP framework. According to House (1981: 542), culture can be defined as “a set of cognitive and evaluative beliefs--beliefs about what is or what ought to be--that are shared by the members of a social system and transmitted to new members.” Whereas explanations of social phenomena as viewed from a structural perspective highlight material conditions as restricting and promoting behavior, a cultural explanation draws attention to how patterned behaviors are due to the transmission of values and beliefs via socialization (McLeod and Lively 2006). The empirical and conceptual distinction between structure and culture has been well-debated within the social sciences (see e.g., Rubinstein 2001) as has been the related debate regarding the distinction between agentic and structural forces on social behavior (see e.g., Giddens 1984). However, because contemporary SSP researchers theorize that “social actors are constrained by the structures in which they are embedded, but they also reproduce these structures with their actions”, this framework allows for the incorporation of both the structural and cultural processes.
involved in the shaping of behavior, as well as a consideration to the role of human agency (McLeod and Lively 2006: 86).

The second orienting principle of SSP, the proximity principle, is concerned with the impact of macro-social processes on individual experiences, and suggests that individuals experience social structure primarily through micro-interactions that occur in such proximal environments as dyads, small groups, and organizations (McLeod and Lively 2006). More specifically, SSP researchers focus on the structure of interpersonal relations (such as social networks and social roles), and interpersonal processes (such as marital interactions or work conditions) that operate within these proximal contexts (McLeod and Lively 2006). In sum, by serving as an “explicit cross-walk between levels of analysis”, the proximity principle provides researchers with an analytic tool to conceptualize the links between macro-social and micro-social processes (Schnittker 2013: 94).

The third principle of the SSP framework, the psychological principle, directs attention to the “psychological mechanisms through which proximal structures and processes affect individual attitudes, feelings, and behaviors” (McLeod and Lively 2006: 92). Stated another way, the psychological principle highlights the importance of understanding how individuals perceive, process, and attribute meaning to the macro-structure and to their experiences within the proximal contexts (McLeod and Lively 2006). Specifying these psychological mechanisms is an important step toward advancing our understanding of the causal processes by which the individual is influenced by the social structure (House and Mortimer 1991).

Guided by the psychological principle, SSP researchers have examined a range of outcomes pertinent to social psychology and the sociology of mental health, such as degree of well-being, personality development, and level of psychological functioning (Schnittker 2013).
SSP researchers have also called for investigative efforts to be aimed toward examining psychological mechanisms as suggested by recent advancements in such fields as social cognition theory and self and identity research (McLeod and Lively 2006).

Taken together, the three principles of the SSP framework direct empirical attention to the relevant components of the social structure, the influence of these components as experienced in proximal contexts, and the processes by which these experiences are understood and made meaningful (Schnittker 2013). To that end, this framework has much utility toward enhancing our understanding of the impact of role transitions on health outcomes. The next section details relevant findings from SSP research in this area.

**SSP, Role Transitions, and Health Outcomes**

One example of how the SSP perspective has been used to examine issues related to role transitions and health outcomes is the stress process framework, which offers a general model within which to account for the differential psychological impacts of transitions. As advanced by Pearlin, Lieberman, Menaghan, and Mullan (1981), this model consists of three conceptual areas: (1) the sources of stress; (2) the mediators and moderators of stress; and (3) the manifestations of stress. Sources of stress can include such experiences as life events (e.g., transitions into and out of major social roles), chronic strains (e.g., long term or recurrent stressors within social roles) and daily hassles (Pearlin et al. 1981). Mediators and moderators of the stress process typically include social resources, such as social support, and such psychological resources as self-efficacy and mastery (Pearlin et al. 1981). Mediators and moderators of the stress process also include coping responses, such as responses intended to modify a situation or responses intended to control the meaning of a situation (Pearlin and Schooler 1978). Manifestations of stress can
present as a number of different mental health outcomes, including depression, anxiety, and substance abuse disorders (Pearlin et al. 1981; Pearlin 1999).

Integrating insights from recent advancements in SSP research, McLeod (2012) extends these ideas by offering an expanded model of the stress process. This expanded model consists of the macrosocial context (structure and culture), proximate life experiences (e.g., interpretation of life circumstances, personal meanings, material and social resources, stressors), and personal responses (e.g., outcomes, assessment of life circumstances and resources). In this model, the macrosocial context shapes proximate life experiences as well as personal responses, and proximate life experiences and personal responses are best represented by a reciprocal relationship (McLeod 2012). According to McLeod (2012), this expanded model provides a more comprehensive understanding of the processes underlying the social distribution of distress.

In an additional example of the utility of the SSP perspective within the sociology of mental health and social psychology, Christie-Mizell and Erickson (2007) applied the SSP framework in their examination of the relationship between mothers’ sense of mastery and neighborhood context. Findings from this examination revealed that mothers’ perceptions of neighborhood disorder moderated the effect of social structure (e.g., marital status, income, physical health) on their sense of mastery (Christie-Mizell and Erickson 2007). As such, this research emphasizes the importance of considering the proximal context (in this case, perceived neighborhood disorder) when attempting to understand the processes by which structural forces impact individual level outcomes (Christie-Mizell and Erickson 2007). In the next section, I detail the specific ways that the life-course and SSP frameworks can be applied to my examination of the relationship between maternal age and PPD.
Theoretical Application

There are several significant points of overlap within the life-course and SSP perspectives that are relevant to my study. Combining insights from the life-course and SSP perspectives concerning the impact of role transitions on mental health outcomes, the potential importance of maternal age to postpartum distress during the transition to parenthood is suggested by both frameworks. The context associated with major role transitions has been a primary concern for life-course theorists (e.g., Hogan 1978). Broadly applying the SSP framework to my research, age serves as a structural (and stratifying) element within the population of those individuals transitioning to parenthood. Beyond these insights, of additional relevance to this research is the ability of these frameworks to help explain why maternal age might matter for postpartum distress.

As previously noted, life-course researchers have suggested that the impact of non-normative transitions may be conditioned by social and psychological resources and responses of the individual (Furstenberg 2005) and influenced by stratification variables (Jackson 2004; MacMillan and Copher 2005). In other words, it is not the timing of the transition per se, but rather proximal factors (such as psychological resources) and structural factors (such as socioeconomic status) that influence the consequences of a disordered or non-normative transition. This perspective not only accounts for the heterogeneity of life course trajectories, but also recognizes the importance of agentic action (George 1996).

The importance of structural and personal factors on transitions is also consistent with the SSP framework. Although many studies within this framework “take stratification as their starting point” (McLeod and Lively 2006:78), the SSP principles also draw attention to understanding how individuals perceive, process, and attribute meaning to the macro-structure
and to their experiences within proximal contexts (McLeod and Lively 2006). Stated another way, the SSP framework helps to explain the structural and psychological mechanisms that serve as the link between macro-level and micro-level social processes. Therefore, the life-course and SSP perspectives point to the significance of examining the structural, cultural, and proximal factors that may condition major life transitions.

To that end, previous research indicates that the relationship between mother’s age at first birth and depression is at least partially mediated by such structural variables as socioeconomic status and such cultural factors as timing expectations (Carlson 2011; Ross and Mirowsky 2002). The next sections detail the specific structural, cultural, and proximal factors that will be examined in this research. Following my discussion of each factor, I include a proposed relationship among my variables of interest based on the existing literature.

**Structural Factors**

The life-course and SSP frameworks suggest that a range of structural characteristics present as important empirical considerations when examining variation during major role transitions. Of primary relevance to the relationship between maternal age and postpartum depression are factors related to socioeconomic status (e.g., income, education) and role occupancy (e.g., employment status and marital status).

**Socioeconomic status.** One of the most consistently demonstrated relationships within the sociological literature concerns the inverse association between socioeconomic status (SES) and mental distress (e.g., Kohn 1972; Kessler and Cleary 1980; McLeod and Kessler 1990). Researchers have proposed a number of explanations to account for this finding. Link and Phelan (1995) argue that social class is closely linked with access to a range of resources, such as
money, knowledge, and power. Because these resources can be employed to avoid disease risk or to minimize the impact of disease once it does occur, SES can thus be considered a “fundamental cause of disease” (Link and Phelan 1995:87). Further, Link and Phelan (1995) argue that in order to better understand the SES-health relationship, we need to look beyond individually-based explanations of disease, such as the individual risk factor of poor health habits; rather, by contextualizing these risk factors, we are in a better position to examine what puts people at risk of being exposed to these risk factors in the first place.

Other researchers have also examined the relationship between social class and mental health from a stress exposure perspective. For example, Turner, Wheaton, and Lloyd (1995) found that the level of stress exposure common to certain social locations correlates with observed variations in mental health statuses. Turner and Avison (2003) also found that stress exposure differences contributed significantly to observed race/ethnicity variations in mental health status. With respect to gender and stress exposure, Kessler and McLeod (1984) suggest that women are more likely than men to be in unfavorable mental health due to their disproportionate exposure to network life events. Although some studies have failed to find evidence to support the stress exposure perspective (for instance, results from Meyer, Schwartz, and Frost (2008) indicate that women, as a group, do not report a greater level of stress exposure than men), findings from within this line of research serve to highlight the diverse ways in which social arrangements can function as stressors that impinge on psychological well-being.

Some researchers have also linked social class to mental health outcomes by suggesting that there is a negative relationship between SES and distress net of stress exposure (Kessler 1979; McLeod and Kessler 1990). This research has emphasized the role of mediating factors – such as perceived control and social support – that make some individuals more vulnerable to
life events and role strains (Pearlin, Lieberman, Menaghan, and Mullan 1981). A key finding regarding the social distribution of distress is that life experiences can vary dependent on social position, with the ability to manage stressful events (such as a major role transition) varying by social status (McLeod and Owens 2004; Schooler 1996). For example, researchers have found that low levels of social support (Turner and Marino 1994) and perceived control (Thoits 1995) correspond with such social statuses as low SES, female gender, being unmarried, and being a member of a minority group. Such resources have been, in turn, linked to mental health outcomes (e.g., Pearlin, Lieberman, Menaghan, and Mullan 1981). As an example of this line of research, Kessler and Cleary (1980) situate their findings in the framework of differential stress vulnerability and reactivity. Based on an analysis of data from the New Haven longitudinal survey of mental disorder, Kessler and Cleary (1980) observed differential stress responses among respondents, suggesting that this can be largely attributed to lower-income individuals’ disadvantages in psychological and social resources (Kessler and Cleary 1980).

In an examination of the relationship between social class and schizophrenia, Kohn (1972) theorizes that due to the adverse life conditions commonly experienced in the lower socioeconomic strata, individuals develop a worldview/orientation that is characterized by rigid, conservative, and fearful thinking. Kohn (1972) surmises that this fatalistic thinking renders individuals unable to effectively manage stressors and negative life events, resulting in increased susceptibility to schizophrenia, thus situating an explanation of the mental health-SES relationship in socialization processes that occur as a result of the structural conditions imposed on individuals positioned within the lower social classes. Thus, findings such as Kessler and Cleary (1980) and Kohn (1972) suggest that lower SES reduces one’s access to the types of psychological and social resources that can serve to buffer mental illness.
Role occupancy. Additional structural characteristics important to the relationship between maternal age at first birth and PPD concern those factors, such as employment status and marital status, which indicate that the respondent occupies roles that typically precede the transition to parenthood. Research supporting a general curvilinear relationship between age and depression suggests that the age range in which individuals hold a number of primary social roles (e.g., employed, parent, spouse) is associated with the least amount of distress (Mirowsky and Ross 1992).

Marital status. Consistent with this suggestion, longitudinal research has traditionally associated marriage with advantageous mental health outcomes (e.g., Umberson 1987). In one example from this line of research, Simon and Marcussen (1999) found that the gain of a marital role results in a decrease in depressive symptomatology, and the loss of a marital role results in an increase in depressive symptomatology. Additionally, results from Wade and Pevalin (2004) indicate that individuals transitioning out of a marriage (via widowhood, divorce, or separation) experience poorer mental health relative to their still-married counterparts.

Various explanations have been advanced to account for the relationship between marriage and mental health. One such explanation is the marital resource model, which suggests that marriage confers a number of psychosocial and economic resources that are advantageous to mental health (Williams, Frech, and Carlson 2009). More specifically, marriage can confer benefits in a range of important domains, such as social benefits (e.g., serving as a source of social support, companionship, and access to a broader social network), psychological benefits (e.g., increased commitment and relationship stability), financial benefits (e.g., the pooling of resources), and institutional and legal benefits (e.g., access to health insurance and tax deductions) (Amato 2015).
In addition to the trend of delayed childbearing discussed above, marital and family formation patterns in the U.S. have undergone a number of important shifts in recent decades (Hayford, Guzzo, and Smock 2014; McLanahan 2004). One such shift has been toward the family formation pattern of non-married cohabitation. However, despite cohabitation being a (now) more common type of family union, research generally supports the finding that cohabitating couples report higher levels of depression relative to married couples (e.g., Brown 2000; Marcussen 2005). Consideration to the psychological and institutional/legal benefits conferred by marriage may help to explain, in part, these observed differences and the continuing mental health advantages of marriage (Amato 2015).

Although investigations in this area suggest that generally, transitioning into marriage is advantageous for mental health and transitioning out of marriage is disadvantageous for mental health, researchers have also recently argued that this trend obscures much heterogeneity among individuals, and thus, have highlighted how demographic, relational, and individual factors can condition the impact of marital unions and dissolutions on psychological well-being (Williams, Frech, and Carlson 2009). For instance, researchers have directed attention to the processes by which relationship satisfaction (e.g., Umberson, Thormeer, and Williams 2013) and beliefs regarding the importance of marriage (e.g., Simon and Marcussen 1999) can influence the mental health consequences of marital transitions. As applied to my research, this argument underscores the importance of considering marital status in combination with other important structural, cultural, and proximal factors.

*Employment status.* Similar to marriage, employment has also been traditionally linked with advantageous mental health outcomes (e.g., Radloff 1975). Recent research conducted in this area continues to find support for the psychological benefits of employment (Hergenrather et
al. 2015; Steele, French, and Bartley 2013). With respect to explanations proposed to explain this finding, one’s employment (or work) often serves as a key source of identity for adults (Tausig 2013). Indeed, Simon (1997) found that the role of “worker” holds a number of positive meanings for individuals (such as those related to financial security, self-sufficiency and independence, goal attainment, stability, and productivity), and can serve as a source of self-worth and self-esteem. Further, employment can increase one’s social network and sense of social inclusion (Evans and Repper 2000).

Similar to researchers who have argued for a more contextual perspective of the impact of marriage on mental health, scholars have also recently called for a more nuanced view of the consequences of employment status on mental health. For example, researchers have highlighted the processes by which such employment-related factors as occupational conditions can shape the mental health impact of employment (e.g., Lennon 1994; Link, Lennon, and Dohrenwend 1993).

However, one’s marital status and one’s employment status continue to be significant factors to consider when attempting to understand and explain observed differences in mental health. For instance, there is little disagreement among researchers regarding the adverse mental health impact of unemployment (Tausig 2013). Accordingly, the importance of marital status and employment status as antecedents of PPD is well demonstrated in the existing literature. For example, a marital status of “single” and an employment status of “unemployed” have consistently been found to be risk factors of PPD (Katon, Russo, and Gavin 2014; Wang, Tiejian, Anderson, and Florence 2011). Further, Ross and Mirowsky (2002) found that controlling for marital status and employment status reduced the association between age and PPD significantly.

Taken together, these findings provide support for the significance of role occupancy to
psychological well-being in the postpartum period. Therefore, in this research where I examine the association between maternal age at first birth and PPD, and attempt to understand the influence of age within the context of other structural and proximal factors, marital status and employment status serve as important considerations.

In sum, the existing research suggests that structure exerts both a direct effect (e.g., Turner, Wheaton, and Lloyd 1995) and an indirect effect (e.g., Link et al. 1993) on mental health. Indeed, structural factors have been consistently linked with maternal mental health in the postpartum period. More specifically, low levels of income, low levels of education, unemployment, and a marital status of single have been identified as risk factors for PPD (Abrams and Curran 2009; Katon, Russo, and Gavin 2014; O’Hara and Swain 1996; Wang et al. 2011). Thus, it is expected that structural factors (i.e., level of education, income, employment status, and marital status) will influence mothers’ level of depression in the postpartum period. Based on the existing literature indicating that the ability to manage stressful events via such resources as social support (Turner and Marino 1994) and perceived control (Thoits 1995) varies by social status, it is also expected that the structural factors of income, education, employment status, and marital status will be positively associated with the proximal variables of social support and perceived control.

The potential influence of these structural factors as important variables in the relationship between maternal age and postpartum depression is further emphasized when considering the finding that older parents differ from younger parents with respect to a number of demographic characteristics (Boivin et al. 2009; Roosa 1998). For example, researchers have found not only a significant relationship between early childbearing and unmarried marital status, but longitudinal evidence also indicates that this association has strengthened over time.
Broadly speaking, individuals that transition to parenthood at older ages are more likely to be married and to have higher levels of education and income relative to their younger counterparts (Pew Research Center 2010). Based on this consistently demonstrated finding regarding the demographic differences between younger and older parents, it is expected that the structural factors of education, income, employment status, and marital status will impact the age at which women transition to parenthood.

Cultural Factors

The significance of culture is emphasized by both the life-course and SSP perspectives. Life-course research is centered on such core principles as the timing of lives and human agency, which serve to draw attention to the importance of culture, embeddedness, process, and context (Elder, George, and Shanahan 1996). The role of culture is also an important consideration within the components principle of the SSP framework (Schnittker 2013). Whereas explanations of social phenomena as viewed from a structural perspective highlight material conditions as restricting and promoting behavior, a cultural explanation highlights how patterned behaviors are due to the transmission of values and beliefs via socialization (McLeod and Lively 2006). As such, the SSP framework allows for the incorporation of both the structural and cultural processes involved in the shaping of behavior, as well as a consideration to the role of human agency (McLeod and Lively 2006: 86). One such culturally-based factor that will be examined in this research concerns the mother’s perception of the timing of her pregnancy. The following section details the processes by which this factor might impact the relationship between maternal age at first birth and PPD.
Perceptions of timing. Consistent with life-course research indicating that the effects of experiencing a role transition are conditioned by the timing of the transition (Hogan 1978), it is expected that the mental health consequences of experiencing the major transition to the role of “parent” is also conditioned by the age of the mother when this transition occurs. In an examination of women’s perceived “age deadlines” regarding family transitions, Settersten and Hägestad (1996) found that the majority of respondents perceived age deadlines for both completing childbearing (86%) and entering motherhood (79%). Though this finding is intriguing with respect to the cultural meanings underlying age deadlines, these deadlines may also reflect recognition of reproductive limitations (Settersten and Hägestad 1996). However, these findings are consistent with other research in this area. For example, Carlson (2012) found that entering marriage both earlier and later than the desired age is associated with higher levels of depressive symptomatology. Thus, although Settersten and Hägestad (1996) caution that the observed childbearing timetables may not be normative and could serve as one of several important influences, when considered together with other family transitions, such as entering marriage, this investigation lends support to the existence of cultural timetables regarding family transitions and to the potential consequences of deviations from these timetables.

The importance of perceptions regarding timing is also suggested by the SSP framework, in particular with respect to consideration of the role of culture. As previously noted, House (1981:542) defined culture as “a set of cognitive and evaluative beliefs-- beliefs about what is or what ought to be--that are shared by the members of a social system and transmitted to new members.” Consideration to the influence of culture, such as beliefs concerning when is the “right time” to bear a child, in a diverse sample of women might not only help to explain the distribution of distress in the postpartum period, but is also consistent with the growing
recognition by SSP scholars regarding the complexity of cultural beliefs and transmission and how this might vary by social group (Schnittker 2013).

In an effort to recognize the heterogeneity of life course trajectories, George (1996: 253) proposes that the impact of a role transition is not necessarily due to whether the sequence/timing was ordered or disordered, but rather perceptions of well-being following a transition are dependent on the “degree to which social environments permit individuals to implement their behavioral choices.” As applied to my research, perceptions of whether women felt that they were early, on time, or late becoming a mother for the first time may matter toward their well-being during this major transition. In fact, Carlson (2011) found that deviations in the expected timing of pregnancy (both later and earlier than expected) was associated with depression for women at 40 years of age. Further, it is likely that the “degree to which social environments permit individuals to implement their behavioral choices” (George 1996: 253) includes whether or not a mother’s social location (in terms of SES) or more proximal experiences (such as level of social support) allowed her to enter parenthood at the time of her choosing. Based on this research, it is expected that perceptions of timing will impact PPD, and perceptions of timing are influenced by structural factors.

In sum, the existing literature demonstrates that timing perception is a critical consideration when attempting to understand the relationship between maternal age and PPD. Specifically, previous research suggests that maternal age and perceptions concerning the timing of the parenthood transition are correlated, that perceptions of timing are influenced by structural and proximal factors, and perceptions of timing impact PPD.
**Proximal Factors**

In addition to these structural and cultural characteristics, the life-course and SSP frameworks also point to the influence of proximal factors as mediating variables in the relationship between maternal age and depression. The next section details the proximal factors that will be explored as potential mediators in this research.

*Social support.* Social support as a conditioning factor is highlighted by both the life-course and SSP frameworks. With respect to the life-course perspective, the principle of *linked lives* is relevant to an examination of mothers’ mental health in the postpartum period. This life-course principle draws attention to how the social networks in which individuals are embedded impact a sociological outcome of interest, including mental health (George 2013). Similarly, the proximity principle in SSP suggests that individuals experience social structure primarily through micro-interactions that occur in such proximal environments as dyads, small groups, and formal organizations (McLeod and Lively 2006). More specifically, SSP researchers frequently focus on the structure of interpersonal relations (such as social networks and social roles) within these proximal environments (McLeod and Lively 2006).

Within the sociological literature, social support is typically considered a socially-based resource that individuals draw on to buffer the impact of stressful life circumstances (Pearlin and Schooler 1978). With respect to conceptualization and operationalization, social support is “best viewed as a metaconstruct” composed of both objective and subjective elements (Turner and Marino 1994: 195). For example, research in this area has disaggregated this construct to include empirical consideration to a myriad of factors, including perceived support, enacted support, emotional support, structural support, and social embeddedness (Barrera 1986; Thoits 1995).
Although some reviews of the literature have indicated mixed results concerning the stress buffering effect of social support (Wheaton 1985), and others have found that the distribution of distress cannot be attributed primarily to differences in levels of social support (Turner and Marino 1994), broadly speaking, high levels of social support have been linked with favorable mental health outcomes, particularly in terms of the stress-buffering effects of perceived support availability (Wethington and Kessler 1986; Umberson, Chen, House, Hopkins, and Slaten 1996). This association has also been demonstrated with respect to the influence of perceived support availability on positive postpartum outcomes for new parents. More specifically, researchers have found that social network factors, such as the quantity and availability of social support (the dimension of social support that will be examined in this research) are important influences on the adjustment and well-being of mothers during the transition to parenthood (Belsky and Rovine 1984; Bost, Cox, Burchinal, and Payne 2002; Goldstein, Diener, and Mangelsdorf 1996). In sum, previous research indicates that mothers’ level of social support will be negatively associated with depression in the postpartum period.

Perceived control. Perceived control serves as an important feature in many theories of psychological functioning. For example, in his description of social cognitive theory, Bandura (2001:1) states that “the capacity to exercise control over the nature and quality of one’s life is the essence of humanness.” In accordance with this statement, high levels of perceived control have been associated with positive psychological well-being, and low levels of perceived control have been associated with negative mental health outcomes (Gecas 1989; Pearlin, Menaghan, Lieberman, and Mullan 1981; Ross and Mirowsky 2013). The explanation underlying these findings is that a feeling of being in control of oneself and one’s environment allows an individual to better combat challenges to the self (Mirowsky and Ross 1989; Ross and Sastry
In other words, distress can result when an individual feels that they lack the capacity to exercise control over the stressors in their life (Bandura 1985). Further, perceived level of control has been linked to a number of structural characteristics, such as age, socioeconomic status, and gender (Ross and Mirowsky 2013).

Perceived sense of control during the transition to parenthood has also been linked to positive postpartum outcomes. For example, Keeton, Perry-Jenkins and Sayer (2008) found that sense of control was negatively associated with symptoms of depression and anxiety for both mothers and fathers during the first year of the postpartum period. Researchers have also examined the influence of perceived control during the childbirth process. For instance, perceived control during the childbirth process was associated with the positive postpartum outcome of satisfaction with pain relief during labor (McCrea and Wright 1999). In an additional example of this line of research, Goecke and colleagues (2012) found that women who reported feeling a loss of control during childbirth due to the mode of delivery (such as needing to have an emergency Caesarean section) reported higher depressive symptoms at 6-months postpartum in comparison to women who experienced a more controlled mode of delivery, such as an elective Caesarean section. Moreover, researchers have found that a perceived positive childbirth experience is related to a number of positive outcomes in the postpartum period (Dencker et al., 2010), including lower reported symptoms of postpartum depression (Gürber et al., 2012). In sum, previous research indicates that mothers’ level of perceived control will be negatively associated with depression in the postpartum period.

As previously discussed, these proximal factors are associated with such structural variables as SES. Previous research also demonstrates that age is associated with these proximal factors. Researchers have found an inverse relationship between age and perceived control, with
sharp declines occurring among the oldest age groups (Shaw and Krause 2001). The relationship between social support and distress has also been studied among young age groups, such as adolescents (Zhang, Yan, Zhao, and Fei 2015) and older age groups (Taylor and Lynch 2004). However, because the sample for this research does not include individuals from the oldest (or youngest) age groups in terms of the general population, other factors may exert more influence on perceived control and social support for the members of my sample. For instance, a consistently demonstrated demographic correlate of perceived control is socioeconomic status (Ross and Mirowsky 2013). Because it is expected that age will be positively associated with SES, it is expected that age will be positively associated with perceived control and social support.

*Proposed Theoretical Model*

Taken together, insights from the life-course and SSP perspectives point to the processes (and factors) by which age might impact postpartum distress. The concurrent application of these theories also enhances the existing literature, given suggestions from scholars regarding the merit of incorporating concepts from the life-course framework into SSP research (McLeod and Lively 2006), and incorporating concepts from SSP into life-course research (George 1996). Exploring a range of structural, cultural, and proximal factors will not only help to elucidate the association between maternal age and postpartum distress, but will also allow for the examination of whether age in combination with these other factors helps to explain the distribution of maternal distress during the postpartum period. Figure 1 illustrates this proposed theoretical model.
Theoretical Paths

In addition to the main relationship under investigation, the association between mother’s age at first birth and postpartum depression, the existing literature suggests a number of theoretical paths between my variables of interest as discussed in detail in the previous sections. The following offers a summary of these proposed paths. In terms of the structural variables, previous research demonstrates that structural factors impact the age at which women transition to parenthood (e.g., Boivin et al. 2009), influence such proximal variables as level of social support and perceived control (Thoits 1995; Turner and Marino 1994), and serve as risk factors for postpartum depression (e.g., Katon, Russo, and Gavin 2014). With respect to the influence of perceptions of timing, previous research demonstrates that perceptions of timing impact PPD.
perceptions of timing and age are correlated (e.g., Settersten and Hägestad
1996), and that these perceptions of timing may be conditioned by the structural and proximal
context (George 1996). Proximal factors, such as social support (e.g., Bost, Cox, Burchinal, and
Payne 2002) and perceived control (Goecke et al. 2012) have been consistently linked with PPD.
Due to the association between age and SES (Ross and Mirowsky 2013), maternal age is also
likely to influence these proximal factors.

Covariates

Based on previous research, a number of potential covariates will be explored as control
variables in my analyses. These covariates include feelings during birth, baby characteristics,
mother’s physical health, and race.

Feelings during birth. Perinatal mood and behavior have been consistently linked with
postpartum mental health outcomes for new parents (e.g., Beck 2001; O’Hara and Swain 1996).
Thus, not surprisingly, having a positive birth experience is also associated with positive
postpartum outcomes (e.g., Goecke et al. 2012; McCrea and Wright 1999). Therefore,
controlling for the potential impact of a negative/positive birthing experience on postpartum
depression is needed. Further, because the data I use in this analysis were collected postpartum, I
am unable to control for the respondent’s prior depression (including perinatal depression).
However, the data includes a measure of negative feelings (e.g., frightened, helpless,
overwhelmed, weak) experienced during the childbirth process. While this measure cannot serve
as a proxy for prenatal depression, including this variable as a statistical control may help to
address this limitation, at least in part.
*Baby characteristics.* Stressors associated with childcare have been consistently linked with postpartum depression (e.g., Beck 2001; Cutrona 1983). Among these stressors, caring for an infant with medical problems has been found to increase maternal risk for developing postpartum depression (Ueda, Yamashita, and Yoshida 2006). Further, mothers suffering from depression may be biased in their reporting of infant characteristics in terms of the attribution of negative characteristics (Robertson, Celasun, and Stewart 2003). Thus, baby’s physical health will be controlled in this research. Baby’s age will also serve as a control variable in this analysis.

*Mother’s physical health.* Poor maternal physical health has been identified as a risk factor for PPD (Brown and Lumley2000; Redshaw and Henderson 2013; Wang et al. 2011). Moreover, child bearing at younger and older ages is associated with increased health risks; therefore, one of the explanations offered by researchers to account for the relationship between age and postpartum depression concerns maternal physical health (Carlson 2011). This claim is based on the links between physical and mental well-being, and consequently, it is argued that mother’s physical health status can explain (at least in part) the curvilinear relationship that has been observed between these variables (Carlson 2011). However, this claim has received mixed support in the existing literature (Carlson 2011) and will therefore be explored as a statistical control in these analyses.

*Race.* Research on PPD prevalence within non-white populations is inconsistent (Howell, Mora, and Leventhal 2003). More specifically, two conflicting themes emerge in the existing literature regarding PPD prevalence within the African American population. First, research has suggested that African American women are at an elevated risk of PPD due to their disproportionate location in lower SES positions, but even when SES factors are held constant,
African American women remain at a higher risk for PPD in comparison to white women (Tandon, Darius, Cluxton-Keller, Leis, Le, and Perry 2012; Howell et al. 2003). In contrast to these findings, previous research has also indicated that in populations with similar SES, there are no observed race differences in PPD rates (Yonkers, Ramin, Rush, Navarrete, Carmody, March, Heartwell, and Leveno 2001; Hutto, Kim-Godwin, Pollard, and Kemppainen 2011). In addition to the mixed support in the existing literature concerning the influence of race on PPD, this variable will be employed as a statistical control in these analyses for two further reasons: (1) in previous studies using observations from the LTMII data set, race was not significantly related to postpartum mental health (Beck, Gable, Sakala, and Declercq 2011); and (2) controlling for race is consistent with existing research that has examined the relationship between maternal age and PPD (e.g., Carlson 2011).

Research Questions and Hypotheses

This research is centered on the following research questions: what is the relationship between maternal age at the transition to parenthood and PPD? And in what ways do structural (socioeconomic status and role occupancy), cultural (perceptions of pregnancy timing), and proximal (social support and perceived control) factors influence this relationship? Based on the existing literature detailed above, I advance several sets of hypotheses regarding the relationships between my variables of interest. These hypothesized relationships are summarized in Figure 2.
My first hypothesis concerns my primary research question: what is the relationship between maternal age at first birth and postpartum depression? As previously discussed, the existing literature concerning the nature of this relationship has been inconsistent, with researchers finding evidence of a negative association, positive association, curvilinear association, and no association between these variables. However, given the existing research supporting a negative association between other stratification elements (such as socioeconomic status) and PPD, as well as previous research suggesting that age is positively associated with such buffering factors as sense of perceived control, I propose a negative relationship between maternal age and PPD. More specifically, this suggests that increases in maternal age will be associated with decreases in PPD.

Figure 2. Theoretical model with hypothesized relationships
Hypothesis 1: Maternal age at first birth will be negatively associated with PPD.

The next set of hypotheses concern the relationships between maternal age and the proximal factors (level of social support during the childbirth process and level of perceived control during the childbirth process). I propose a positive relationship between maternal age and these proximal factors, which suggests that increases in maternal age at first birth will be associated with higher levels of social support and perceived control during the childbirth process.

Hypothesis 2a: Maternal age at first birth will be positively associated with social support.

Hypothesis 2b: Maternal age at first birth will be positively associated with perceived control.

The next set of hypotheses concern the perceptions of pregnancy timing variable and its associations with PPD and the proximal variables. I propose a negative relationship between perceptions of being “on time” and PPD, suggesting that increases on this variable will be associated with decreases in levels of PPD.

Hypothesis 3: Perceptions of being “on time” will be negatively associated with PPD.

I propose a positive relationship between perceptions of timing and the proximal variables. This suggests that perceptions of being “on time” will be associated with higher levels of social support and perceived control.

Hypothesis 4a: Perceptions of being “on time” will be positively associated with social support.

Hypothesis 4b: Perceptions of being “on time” will be positively associated with perceived control.
The next set of hypotheses draw on life-course and SSP perspectives by examining the role of structural variables (Hypothesis 5) and role occupancy (Hypothesis 6) on maternal age, perceptions of timing, postpartum depression, and the proximal variables. I propose a positive relationship between these structural factors and maternal age. In general, this suggests that higher levels of socioeconomic status (i.e., income and education) and occupying other social roles (i.e., being employed and married) will be associated with increases in maternal age at first birth.

_Hypothesis 5a:_ Income will be positively associated with maternal age at first birth.

_Hypothesis 5b:_ Education will be positively associated with maternal age at first birth.

_Hypothesis 6a:_ Being employed will be positively associated with maternal age at first birth.

_Hypothesis 6b:_ Being married will be positively associated with maternal age at first birth.

I also propose a positive relationship between the structural variables and perceptions of timing. This suggests that socioeconomic status and role occupancy will be associated with perceptions of being “on time.”

_Hypothesis 7a:_ Income will be positively associated with perceptions of being “on time.”

_Hypothesis 7b:_ Education will be positively associated with perceptions of being “on time.”

_Hypothesis 8a:_ Being employed will be positively associated with perceptions of being “on time.”

_Hypothesis 8b:_ Being married will be positively associated with perceptions of being “on time.”
Based on the discussion above, I propose a negative relationship between the structural variables and PPD, which suggests that socioeconomic status and role occupancy will be associated with decreases in PPD.

*Hypothesis 9a*: Income will be negatively associated with PPD.

*Hypothesis 9b*: Education will be negatively associated with PPD.

*Hypothesis 10a*: Being employed will be negatively associated with PPD.

*Hypothesis 10b*: Being married will be negatively associated with PPD.

My next set of hypotheses concern the relationships between the structural and proximal factors. I propose a positive relationship between the structural and proximal variables, suggesting that increases in levels of socioeconomic status, as well as role occupancy based on employment and marital status, will be associated with increases in levels of social support and perceived control. More specifically,

*Hypothesis 11a*: Income will be positively associated with social support.

*Hypothesis 11b*: Income will be positively associated with perceived control.

*Hypothesis 11c*: Education will be positively associated with social support.

*Hypothesis 11d*: Education will be positively associated with perceived control.

*Hypothesis 12a*: Being employed will be positively associated with social support.

*Hypothesis 12b*: Being employed will be positively associated with perceived control.

*Hypothesis 12c*: Being married will be positively associated with social support.

*Hypothesis 12d*: Being married will be positively associated with perceived control.
My final set of hypotheses concern the relationships between the proximal variables and PPD. I propose a negative association between these proximal variables and PPD, suggesting that higher levels of social support and perceived control will be associated with decreases in PPD.

_Hypothesis 13a_: Social support will be negatively associated with PPD.

_Hypothesis 13b_: Perceived control will be negatively associated with PPD.

To summarize this chapter, previous research suggests that the transition to parenthood is a challenging and stressful period for new parents. Postpartum depression (PPD) is one potential manifestation of stress that mothers can experience during this critical transition. In this dissertation research I examine the impact of a key sociological variable, mother’s age at first birth, on postpartum depression. The existing literature concerning the influence of maternal age on PPD is inconsistent, which suggests that mother’s age in combination with other factors may help to explain the distribution of maternal distress during the postpartum period. I utilize theoretical insights from life-course theory and the SSP framework to examine a range of structural (income, education, marital status, employment status) cultural (perceptions regarding the timing of pregnancy), and proximal (social support and perceived control during birth) factors that may serve to condition the influence of maternal age on postpartum depression during the transition to parenthood. This concurrent application of frameworks results in the theoretical model illustrated in Figure 1. The methodology I employ to analyze this theoretical model is detailed in the next chapter.
CHAPTER THREE

METHODS

In this chapter I detail the methodological approach used in my research. I first describe the data collection procedures for the *Listening to Mothers II* survey and the characteristics of the sample. I then describe the measurement of the key variables of interest. This chapter concludes with a discussion of my analytic strategy, including my plan to address missing data.

*Data and Sample*

The data for this project are derived from *Listening to Mothers II: Second National U.S. Survey of Women’s Childbearing Experiences* (LTMII) (Childbirth Connection 2006). This national survey on motherhood was conducted by Harris Interactive on behalf of Childbirth Connection in partnership with Lamaze International. Childbirth Connection is a program within the National Partnership for Women and Families, with a mission statement to “to improve the quality and value of maternity care through consumer engagement and health system transformation” (Childbirth Connection 2015). Eligibility criteria for the LTMII survey included women between the ages of 18-45 years who had given birth to a single child (who was living at the time of the interview) in a U.S. hospital in 2005. Surveys were completed between January 20, 2006 - February 21, 2006. Interviews were conducted in English and took approximately thirty minutes to complete. To minimize potential response bias, interviews were conducted via
telephone and online. Telephone participants were recruited from a list of households provided by Survey Sampling International; online participants were drawn from the Harris Poll Online (HPOL) panel. These recruitment strategies yielded a sample size of 1,382 online interviews and 191 telephone interviews (total n = 1,573).

The LTMII data set is ideal for the aims of this research for a number of reasons. First, LTMII is part of a series of landmark data collection efforts focused on the population of new mothers. Specifically, the Listening to Mothers I survey, conducted in 2002, was the “first national United States survey of women’s maternity experiences” and as such, this survey offered an “unprecedented opportunity” to examine the transition to parenthood experiences of new mothers in the U.S. (Declercq, Sakala, Corry, and Applebaum 2006:2). LTMII builds upon the initial survey, including not only many of the original items, but also new content (Declercq, Sakala, Corry, and Applebaum 2006). Therefore, this data set provides me with an opportunity to examine the experiences of new mothers, a population that is traditionally difficult to access. This advantage is further emphasized given that much of the previous work focusing on maternal age and depression has been comprised of retrospective accounts.

A second strength of this data set concerns the characteristics of the sample. In addition to being a national survey, the LTMII sample is comparable to the population of U.S. women who gave birth in 2005 (Declercq, Sakala, Corry, and Applebaum 2006). Third, there is sufficient variation among the ages of the women in the sample to allow for an examination of my key theoretical relationships. As previously noted, new mothers are a population that has been difficult to access, and this is particularly the case for women who transition to parenthood at older ages (Carolan 2005; McMahon et al. 2015). To that end, the LTMII data set includes
observations from women from a wide range of ages and older mothers are well represented within the sample.

For the purposes of this project, it was necessary for me to restrict the data used in the analyses in two ways. First, I restricted the sample to only those respondents who completed the online survey (n = 1,382). This was necessary because the questionnaire administered to the telephone respondents did not include every question that was administered to the online respondents. Omitted questions included those assessing two of my variables of interest, social support and perceived control during birth.

Second, because the focus of my dissertation is on the transition to parenthood (i.e., becoming a mother for the first time) and because previous research suggests that postpartum adjustment can differ by parity (Gameiro, Moura-Ramos, and Canavarro 2009; O’Hara, Hoffman, Philipps, and Wright 1992), the sample used in this research is restricted to primiparous (i.e., first-time) mothers. Restricting the sample to online respondents and first-time mothers yielded a final sample size of n = 471. The demographic characteristics for my sample are discussed in detail in Chapter Four (Descriptive Statistics). The demographic characteristics for the omitted respondents (first-time mothers who completed the telephone interview, n = 77) can be found in Appendix A (Table 9). Supplementary analyses conducted via independent group t-tests and chi-square tests (not shown) indicate that significant differences in mean scores were observed between the retained (online survey) respondents (n = 471) and the omitted (telephone survey) respondents (n = 77) on the following variables: maternal age (p = .044), income (p = .002), education (p = .004), marital status (p = .001), employment status (p = .020) and race (p = .000). Mean scores between the retained and omitted respondents did not differ for
the outcome variable of postpartum depression \( (p = .648) \), nor the cultural variable of perceptions of pregnancy timing \( (p = .182) \).

**Measures**

**Independent Variable**

The main independent variable of interest for this research is *mother’s age at first birth* (also referred to as *maternal age*). This variable was assessed with the question: “What is the year of your birth?” Respondents’ ages were then calculated by the primary investigators. This variable is measured on a continuous scale. I also explored measuring maternal age on a categorical scale and as a polynomial (quadratic) variable; results from these analyses are discussed at the end of Chapter 4 (*Supplemental Analyses*).

**Dependent Variable**

The primary dependent variable in this research is *postpartum depression* (also referred to as *PPD*). Following existing research in this field, I use the term postpartum depression to refer to symptoms of depression specifically related to new parenthood and not to a formal diagnosis of PPD. This variable is measured with the Postpartum Depression Screening Scale-Short Form (PDSS) (Beck and Gable 2002). Participants were asked to report how they felt in the last two weeks on 7 items assessing a range of indicators, such as mood and sleep disturbances. Example items on the 7-item instrument included: “I got anxious over even the littlest things that concerned my baby”, “I felt like my emotions were on a roller coaster,” and “I had trouble sleeping even when the baby was asleep.” Responses to each item ranged from
“strongly disagree” = 1 to “strongly agree” = 5. A sum score was created by summing the scores from the seven items, with higher scores indicating higher levels of postpartum depression. Potential scores on this variable range from 7-35. The PDSS is a well-validated measure of postpartum depression (Beck and Gable 2002). Further, the PDSS is appropriate for use in the current research because in contrast to measures of generalized distress or depression, this scale was designed to accurately assess the experience of individuals transitioning into the new role of motherhood (Beck and Gable 2000). The PDSS scale demonstrated high internal consistency for the respondents in my sample (α = .89). Please refer to Appendix B for the complete scale.

Structural Variables

Consistent with the theoretical insights outlined above, a number of structural variables related to issues of socioeconomic resources and role occupancy will be explored in this analysis. These structural variables include education, income, employment status, and marital status.

Education was assessed with the question: “What is the highest level of education you have completed or the highest degree you have received?” Response options for this question were coded: “less than high school” = 1, “some high school” = 2, “high school or equivalent (e.g., GED)” = 3, “associate’s degree” = 4, “some college, but no degree” = 5, “college (e.g., B.A., B.S.)” = 6, “some graduate school, but no degree” = 7, and “graduate school (e.g., M.S., M.D., Ph.D.)” = 8.

Income was measured with the question: “Which of the following income categories best describes your total 2005 household income before taxes?” Response choices for this question were coded: “less than $15,000” = 1, “$15,000 to $24,999” = 2, “$25,000 to $34,999” = 3,
“$35,000 to $49,999” = 4, “$50,000 to $74,999” = 5, “$75,000 to $99,999” = 6, and “$100,000 and more” = 7.

Employment status was measured with the question: “Were you employed when you were pregnant?” Response options for this variable included: “no”, “yes – part time (on average less than 30 hours a week)” and “yes - full time (on average 30 or more hours a week).” The data set includes a question regarding current (at the time of the survey) employment status, but as I am attempting to assess whether respondents occupy the role of “worker”, I use the pregnancy employment measure in the event that respondents were not working at the time of the survey due to such factors as maternity leave or medical complications resulting from childbirth. With respect to the coding of the employment status variable, in an analysis not shown, I compared the relative effects of part-time and full-time employment on the dependent variable of PPD, and found them not to differ from one another. Further, as I am interested in role occupancy (i.e., whether or not one holds the role of “worker”), this variable was coded as follows: “no” = 0, “yes – part time” = 1, and “yes - full time” = 1, resulting in a dichotomous measure (0 = not employed, 1= employed).

Marital status was assessed with the question: “At the time you gave birth, were you…?” Response categories for this question were: “unmarried with no partner”, “unmarried with a partner”, and “married.” Because I am interested in role occupancy (i.e., whether or not one holds the role of “married”), this variable was coded as follows: “unmarried with no partner” = 0, “unmarried with a partner” = 0, and “married” = 1, resulting in a dichotomous measure (0 = not married, 1 = married).
Cultural Variables

As suggested by the life-course and SSP frameworks, I also include consideration to the cultural factor of mothers’ perceptions regarding the timing of the pregnancy. Perceptions of timing was assessed with the item: “Thinking back to just before you got pregnant, did you want to be pregnant…?” Response choices for this question were: “sooner”, “later”, “at that time”, and “you didn’t want to be pregnant then or any time in the future.” As I am attempting to explore whether perceptions of being “on time” with one’s pregnancy is of consequence to postpartum mental health, this variable was coded: “you didn't want to be pregnant then or any time in the future” = 0, “sooner” = 0, “later” = 0, and “at that time” = 1, resulting in a dichotomous measure (0 = not on time, 1= on time). Although the distinctions between “didn’t want to be pregnant”, “sooner”, and “later” may be of theoretical interest, for the purposes of this research, the three categories were combined as they represent a perception of being off-time with one’s pregnancy. Further, previous research (e.g., Carlson 2011) indicates that mistiming in either direction (i.e., both earlier than expected and later than expected) is associated with maternal distress.

Proximal Variables

The third set of variables that will be examined in this analysis concern those proximal factors that potentially serve to explain the relationship between maternal age and postpartum depression. These variables include social support during the childbirth process (including availability and receipt of support resources), and perceived personal control during the childbirth process.
Social support during birth was assessed by asking respondents: “Some women receive supportive care while in labor and giving birth, which can involve helping to make them more comfortable physically, providing emotional support, and providing information. Who, if anyone, provided you with this type of support while you were in labor or giving birth? Please select all that apply.” This was followed by a list of eight support sources: “my partner/husband”, “another family member or friend”, “a doula or trained labor assistant”, “the nursing staff”, “a doctor”, “a midwife” “other health professional”, and “other.” Responding “yes” to a social support source was coded as 1. A sum score was then created for the eight items, with higher scores indicating higher levels of social support.

Perceived control during birth was assessed with a sum score created from three items. These three items measure issues ranging from patient rights about medical procedures, decision making processes, and potential complications during birth. A sample item is: “Assuming there are no medical complications, who should make the most decisions about your labor and birth experience?” Response choices for this sample item were coded: “I should make decisions after considering the advice of my caregivers” = 4, “I should share decision making with my caregivers” = 3, “My caregivers should make the decisions after consulting with me” = 2, and “My caregivers should make the decisions” = 1.” The response choices for the two additional items were coded similarly, with higher numbers indicating a higher level of perceived control. A sum score was then created for the three items with higher numbers on this scale indicating higher levels of perceived control during the childbirth process. This scale demonstrated moderate internal consistency (α = .49). Please refer to Appendix C for the complete scale.
Control Variables

Potential control variables that were explored in my analyses include feelings during birth, baby’s age, baby’s health, mother’s physical health, and race.

Feelings during birth was assessed by asking respondents: “The following is a list of words that may describe how you felt while giving birth. Please indicate whether this describes how you may have felt.” This question was followed by a list of 12 words; respondents were asked to select all that applied. This list includes both negative coded and positive coded words. Following research which suggests that positive and negative emotions are orthogonal risk factors in that positive affect confers benefits to health independent of the impact of negative affect on well-being (e.g., Keyes 2002; Suh, Diener, and Fujita 1996), this variable was separated into negative feelings during birth and positive feelings during birth. To create the negative feelings variable, I assigned each negative coded word (“agitated”, “groggy”, “frightened”, “helpless”, “overwhelmed”, and “weak”) one point, with each respondent ranging from 0-6 on this scale. Each positive coded word (“alert”, “calm”, “capable”, “confident”, “powerful”, and “unafraid”) was also assigned one point, with respondents ranging from 0-6 on this scale as well. The negative feelings scale demonstrated moderate internal consistency ($\alpha = .60$), while the positive feelings scale demonstrated higher internal consistency ($\alpha = .73$).

Two child characteristics, age and health, were explored as control variables. Baby’s age was calculated via a question asking respondents the day, month, and year of their baby’s birth. Baby’s health was assessed by asking respondents: “Overall, how would you rate your baby's health since birth?” Response choices for this variable were coded: “poor” = 1, “fair” = 2, “good” = 3, and “excellent”= 4, with higher numbers indicating more positive perceptions of baby’s health.
Two additional characteristics of the mother were explored as control variables: mother’s physical health and race. *Mother’s health* was assessed by asking respondents: “Overall, how would you describe your health?” Response options for this variable were coded: “poor” = 1, “fair” = 2, “good” = 3, “very good” = 4, and “excellent” = 5, with higher numbers indicating more positive perceptions of one’s physical health. *Race* was measured by asking respondents: “Do you consider yourself…?” Response options for this variable were: “white”, “Black or African American”, “Asian or Pacific Islander”, “Native American or Alaskan Native”, “Hispanic”, “Mixed Racial Background”, and “Other Race”. Because there were not enough cases within the categories of this variable to examine race differences more broadly, race was coded as a dichotomous measure (white = 1, non-white = 0).

*Analytic Strategy*

The relationship between maternal age and postpartum depression was tested in three phases. I first calculated the descriptive statistics for the variables of interest. In the second phase of data analysis, the bivariate associations between the key study variables were examined. In the third phase of data analysis, I utilized structural equation modeling (SEM) to estimate the theoretical model illustrated in Figure 1. The technique of SEM is particularly useful for assessing mediating relationships (Preacher and Hayes 2008), such as those proposed in my theoretical model. The statistical software program Stata (StataCorp 2013) was used to conduct these analyses.

*Missing Data*

The LTMII data set does not contain missing values on the variables of interest in this examination. There were, however, responses coded as “not sure” or “decline to answer” for
three of the variables. These variables were as follows: marital status (three responses, less than 1% of the sample), race (five responses, 1.1% of the sample), and income (forty two responses, 8.9% of the sample). These responses were recoded as system missing. During statistical analysis, Stata utilizes listwise deletion to handle these missing values.
CHAPTER FOUR

RESULTS

In this chapter I present the results from three phases of data analysis. First, I present the descriptive statistics for my variables of interest. Second, I present the findings from an analysis of the bivariate relationships among the key study variables. Third, I present the results from the structural equation modeling (SEM) estimations, including a discussion of the fit of the theoretical model illustrated in Figure 1. This chapter concludes with a discussion of three supplemental analyses I conducted. I first explored alternative ways to assess the independent variable by measuring maternal age on a categorical scale and as a polynomial (quadratic) variable. In the third supplemental analysis, I explored alternative ways of conceptualizing my theoretical relationships of interest by assessing the proximal variables as moderating the relationship between maternal age and PPD, rather than mediating this relationship.

Descriptive Statistics

In the first stage of data analysis, I computed descriptive statistics for the variables of interest in my study. Descriptive statistics for the independent variable of maternal age and dependent variable of PPD are summarized in Table 1. The ages of the women in my sample ranged from 18 years old to 43 years old, with a mean age of 27.27 years old (SD=4.89). This is
slightly higher than the average age at first birth for U.S. women in 2005, which was 25.2 years old (National Vital Statistics System 2007). Table 1 also presents descriptive statistics for maternal age measured as a categorical variable, which I will discuss in greater detail at the end of this chapter (Supplemental Analyses).

With respect to postpartum depression, scores on this variable ranged from 7-35, with a mean score of 17.02 (SD=6.77). The average level of PPD in this sample is relatively high; in clinical contexts, it is recommended that individuals scoring a 14 or higher on this initial (7 item) screening complete the full (35 item) PDSS measure (Declercq, Sakala, Corry, and Applebaum 2006).

Table 1. Descriptive Statistics for the Independent and Dependent Variables (n=471)

<table>
<thead>
<tr>
<th></th>
<th>Percent/Mean (SD)</th>
<th>Range</th>
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<tbody>
<tr>
<td><strong>Maternal Age (in years)</strong></td>
<td></td>
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</tr>
<tr>
<td>18-25 years</td>
<td>38.64%</td>
<td></td>
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<tr>
<td>26-34 years</td>
<td>53.08%</td>
<td></td>
</tr>
<tr>
<td>35+ years</td>
<td>8.28%</td>
<td></td>
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<tr>
<td><strong>Postpartum Depression</strong></td>
<td>17.02 (6.77)</td>
<td>7-35</td>
</tr>
</tbody>
</table>

Table 2 summarizes the descriptive statistics for the structural variables. In terms of level of education, the following was reported by the sample: less than high school = 1.06% of the sample, some high school = 1.49%, high school degree (or GED) = 10.62%, associate’s degree = 9.34%, some college = 34.61%, college degree = 25.69%, some graduate school = 5.10%, and
graduate school degree = 12.10%. The following household income per year categories were reported by the respondents: less than $15,000 = 7.23% of the sample, $15,000-24,999 = 11.19%, $25,000-34,999 = 14.45%, $35,000-49,999 = 20.28%, $50,000-74,999 = 27.51%, $75,000-99,999 = 9.56%, and $100,000 or more = 9.79%.

With respect to marital status at the time of birth, 5.98% of the sample reported that they were unmarried with no partner, 24.36% of the sample reported that they were unmarried with a partner, and 69.66% of the sample reported a marital status of married. In terms of employment status while pregnant, 21.66% of the sample reported that they were not employed, 20.38% of the sample reported working part-time, and 57.96% of the sample reported working full time.
Table 2. Descriptive Statistics for the Structural Variables (n=471)

<table>
<thead>
<tr>
<th>Education</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>1.06%</td>
</tr>
<tr>
<td>Some high school</td>
<td>1.49%</td>
</tr>
<tr>
<td>High school degree (or GED)</td>
<td>10.62%</td>
</tr>
<tr>
<td>Associate’s degree</td>
<td>9.34%</td>
</tr>
<tr>
<td>Some college</td>
<td>34.61%</td>
</tr>
<tr>
<td>College degree</td>
<td>25.69%</td>
</tr>
<tr>
<td>Some graduate school</td>
<td>5.10%</td>
</tr>
<tr>
<td>Graduate school degree</td>
<td>12.10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $15,000</td>
<td>7.23%</td>
</tr>
<tr>
<td>$15,000-24,999</td>
<td>11.19%</td>
</tr>
<tr>
<td>$25,000-34,999</td>
<td>14.45%</td>
</tr>
<tr>
<td>$35,000-49,999</td>
<td>20.28%</td>
</tr>
<tr>
<td>$50,000-74,999</td>
<td>27.51%</td>
</tr>
<tr>
<td>$75,000-99,999</td>
<td>9.56%</td>
</tr>
<tr>
<td>$100,000 or more</td>
<td>9.79%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital Status</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmarried with no partner</td>
<td>5.98%</td>
</tr>
<tr>
<td>Unmarried with a partner</td>
<td>24.36%</td>
</tr>
<tr>
<td>Married</td>
<td>69.66%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment Status</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>21.66%</td>
</tr>
<tr>
<td>Yes (part time)</td>
<td>20.38%</td>
</tr>
<tr>
<td>Yes (full time)</td>
<td>57.96%</td>
</tr>
</tbody>
</table>

The descriptive statistics for the cultural and proximal variables are reported in Table 3. With respect to the feelings regarding the timing of pregnancy variable, 2.12% of the sample reported that they did not want to become pregnant at the time that they did (or at any time), 18.05% reported that they wanted to be pregnant sooner, 38.85% reported that they wanted to be pregnant later, and 40.98% reported that they became pregnant at the desired time. In terms of the proximal factors, potential scores on the social support during birth variable ranged from 0-8;
actual scores on this scale ranged from 0-6, with a mean score of 2.52 (SD=1.10). Potential scores on the perceived control during birth variable ranged from 3-10; actual scores on this variable ranged from 5-10, with a mean score of 8.95 (SD=1.30).

---

**Table 3. Descriptive Statistics for the Cultural and Proximal Variables (n=471)**

<table>
<thead>
<tr>
<th></th>
<th>Percent/Mean (SD)</th>
<th>Potential Range</th>
<th>Actual Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceptions Regarding the Timing of Pregnancy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not want to be pregnant</td>
<td>2.12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant sooner</td>
<td>18.05%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant later</td>
<td>38.85%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant at that time</td>
<td>40.98%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Support During Birth</strong></td>
<td></td>
<td>0-8</td>
<td>0-6</td>
</tr>
<tr>
<td></td>
<td>2.52 (1.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Perceived Control During Birth</strong></td>
<td></td>
<td>3-10</td>
<td>5-10</td>
</tr>
<tr>
<td></td>
<td>8.95 (1.30)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Descriptive statistics were also computed for the control variables that were explored in this analysis. In terms of the physical health measures, scores for the baby’s health variable ranged from 1-4, with a mean score of 3.75 (SD=.523). Scores for the mother’s health variable ranged from 1-5, with a mean score of 3.58 (SD=.816). With respect to feelings during birth, scores on the negative feelings during birth variable ranged from 0-6, with a mean score of 2.10 (SD=1.63) and scores on the positive feelings during birth ranged from 0-6, with a mean score of 1.76 (SD=1.75). For the mothers in my sample, baby’s age ranged from less than 1 month old to 12 months old, with an average age of 7.95 months old (SD=2.84). With respect to race, 76.82% of the sample identified as white, 7.30% identified as Black or African American, 8.80%
identified as Hispanic, 3.43% identified as Asian or Pacific Islander, 1.29% identified as Native American or Alaskan Native, and 2.36% identified as Mixed Racial Background.

**Bivariate Statistics**

In the second phrase of data analysis, I examined the bivariate relationships among the key study variables. The results from this analysis are summarized in Table 4. With respect to the primary independent variable, maternal age was significantly correlated with a number of variables in the model, including the outcome variable of PPD (r = -.117, p = .05), the four structural variables of income (r = .448, p = .000), education (r = .405, p = .000), employment status (r = .206, p = .000), and marital status (r = .364, p = .000), and the cultural variable of perceptions of timing (r = .230, p = .000). Maternal age was also correlated with four of the control variables: baby’s health (r = .100, p = .030), baby’s age (r = .126, p = .006), positive feelings during birth (r = -.094, p = .042), and race (r = .120, p = .010).

Significant correlations were also observed between the dependent variable of PPD and the other variables in my model. In addition to maternal age, PPD was correlated with income (r = -.146, p = .003), employment status (r = -.103, p = .026), marital status (r = -.140 p = .003), perceptions of timing (r = -.139, p = .003), perceived control during birth (r = -.143, p = .002), and the control variables of negative feelings during birth (r = .260, p = .000), positive feelings during birth (r = -.159, p = .001), baby’s health (r = -.177, p = .001), and mother’s health (r = -.187, p = .000). Additional significant correlations among my variables of interest can be found in Table 4.
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
|-----|--------------|-----|--------|-----|-----------|-----|-------------------------------|-----|-----------------------------|-----|-----------------------------|-----|----------------|-----|-------------|-----|-------------|-----|----------------|-----|----------------|-----|----------------|-----|----------------|-----|
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |
| (1) | Maternal Age | (2) | Income | (3) | Education | (4) | Employment Status (1=employed) | (5) | Marital Status (1=married) | (6) | Perceptions of Timing (1=on time) | (7) | Perceived Control | (8) | Social Support | (9) | PPD | (10) | Baby's Health | (11) | Mother's Health | (12) | Baby's Age | (13) | Negative Feelings During Birth | (14) | Positive Feelings During Birth | (15) | Race (1=white) |

* Correlation is significant at the .05 level (2-tailed); ** Correlation is significant at the .01 level (2-tailed); *** Correlation is significant at the .00 level (2-tailed)

1 Pairwise deletion was used to handle missing values
Structural Equation Modeling (SEM) Results

In the third phase of data analysis, I utilized structural equation modeling (SEM) to estimate the theoretical model illustrated in Figure 1. The following sections detail these results. I first offer discussion concerning overall model fit. I then present the results for the SEM estimations for the final trimmed model.

Overall Model Fit

My initial SEM model consisted of the variables and paths as illustrated in Figure 1. The six control variables (mother’s health, baby’s health, negative feelings during birth, positive feelings during birth, baby’s age, and race) were entered into the initial model as “free-to-float” control variables. As detailed in the Measures section in Chapter 3, four factors were entered as dichotomous variables: marital status (0 = not married, 1 = married), employment status (0 = not employed, 1 = employed), perceptions of timing (0 = not on time, 1 = on time) and race (0 = non-white and 1 = white). All other variables in the model were treated continuously. An examination of the bivariate correlation matrix (Table 4) did not reveal any issues with multicollinearity.

Following previous research, I use the comparative fit index (CFI) and root mean square error of approximation (RMSEA) values to assess model fit. The comparative fix index (CFI) values can range from 0.0 to 1.00, with values close to 1.00 indicating a good fit of the data. Traditionally, a CFI value above .90 was considered acceptable; recent research suggests that a criterion of .95 be used to represent a good fit of the data (Hu and Bentler 1999; Hooper, Coughlan, and Mullen 2008). With respect to the root mean square error of approximation (RMSEA), a value less than .08 was traditionally considered the standard when assessing model
fit; recently, researchers have proposed that RMSEA values below .06 indicate a good fit of the data (Hu and Bentler 1999; Hooper, Coughlan, and Mullen 2008).

Chi-square ($\chi^2$) is also used in some estimations as an additional indicator of model fit; specifically, a good fit is indicated when the $p$ value associated with the chi-square is non-significant. However, chi-square is sensitive to sample size; in SEM estimations with a sample size greater than 400, which is the case in my research, the chi-square test will typically yield a significant $p$ value (Bentler and Bonett 1980; Kenny 2015). As such, alternative fit statistics, such as CFI and RMSEA, are utilized to assess fit for models using large samples (Kenny 2015).

The initial model as illustrated in Figure 1 did not fit the data well: $\chi^2=96.01$ (df=31, N=422, p=.000), CFI=.753, RMSEA=.070. Although the RMSEA value for the model (.070) is less than the tradition standard of .08, the CFI value for model (.753) is not greater than the tradition standard of .900. The modification indices values suggested several structural pathways could be added to the model to improve the overall fit. These pathways were as follows: negative feelings during birth and PPD, positive feelings during birth and PPD, baby’s health and PPD, mother’s health and PPD, positive feelings during birth and social support, and negative feelings during birth and perceived control.

All six of the suggested pathways are consistent with the existing literature in this area. With respect to the pathways recommended between negative feelings during birth and positive feelings during birth and the other variables, perinatal mood and behavior have been consistently linked with postpartum mental health (e.g., Beck 2001; O’Hara and Swain 1996); in particular, research suggests that a positive birth experience is associated with a range of positive postpartum outcomes for new parents (e.g., Goecke et al. 2012; McCrea and Wright 1999). In terms of the other suggested pathways, baby’s health (e.g., Ueda, Yamashita, and Yoshida 2006)
and mother’s health (e.g., Redshaw and Henderson 2013) have also been linked with mental health adjustment during the postpartum period.

For two of the control variables (race and baby’s age), no structural paths were suggested. As noted in Table 4, neither variable was correlated with PPD. I conducted several additional statistical analyses to investigate this further. I first used Ordinary Least Squares (OLS) regression to regress baby’s age on postpartum depression. I then conducted two analyses to assess the relationship between race and postpartum depression: a one-way analysis of variance (ANOVA) measuring race with all categories and a t-test measuring race as a dichotomous variable (white, not white). These analyses indicated that neither baby’s age nor race was significantly associated with the dependent variable of postpartum depression. In an effort to preserve degrees of freedom, these two variables were not retained for further analysis.

The six structural paths were added to the initial model as suggested by the modification indices and the existing literature, and the model was re-estimated, resulting in the final trimmed model. The final trimmed model fit the data well: $\chi^2=28.07$ (df=15, N=427, p=.021), CFI=.951, RMSEA=.045. Although the p value associated with the chi-square statistic remains significant, the CFI value for the trimmed model (.951) exceeds both the traditional standard of .900, and the recently advanced criterion of .950 (Hu and Bentler 1999). Further, the trimmed model’s RMSEA value (.045) is below both the traditional standard of .080 and the recently proposed criterion of .060. In the following sections I present the results for this final trimmed model.

**SEM Estimates for the Final Trimmed Model**

In their influential work on mediation analysis, Baron and Kenny (1986) recommended the estimation of a series of linear regression models to test for mediation. In recent decades, one
of the primary advantages that has emerged concerning the use of SEM to test for mediation is that instead of a series of equations, a single model can be estimated, even in models with multiple independent variables, multiple outcome variables, and multiple mediators (StataCorp 2015; Gunzler, Chen, Wu, and Zhang 2013). To test for mediation using Stata software, the direct, indirect, and total effects for the pathways in the model are estimated.

As defined by Gunzler and colleagues (2013:392), the direct effect that is estimated during this process is the “pathway from the exogenous variable to the outcome while controlling for the mediator” and the indirect effect is the “pathway from the exogenous variable to the outcome through the mediator.” The total effect can be described as the “sum of the direct and indirect effects of the exogenous variable on the outcome” (Gunzler, Chen, Wu, and Zhang 2013:392). Stated another way, the total effect can be conceptualized as: \( \text{direct effect} + \text{indirect effect} = \text{total effect} \) (StataCorp 2015).

In the following sections I detail the direct effects, the indirect effects, and the total effects for the SEM estimation for the final trimmed model.

**Direct Effects**

As previously noted, the direct effects represent the paths from the exogenous variable to the dependent variable controlling for any mediators (Gunzler, Chen, Wu, and Zhang 2013). The standardized coefficients and standard errors for the direct effects pathways for the final trimmed model are summarized in Table 5. Figure 3 illustrates the significant direct effects.
Table 5. Standardized Coefficients and Standard Errors for the Trimmed SEM Model, Direct Effects (n=427)

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>(se)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct Effects on Postpartum Depression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>-.053</td>
<td>(.077)</td>
</tr>
<tr>
<td>Income</td>
<td>-.052</td>
<td>(.227)</td>
</tr>
<tr>
<td>Education</td>
<td>.038</td>
<td>(.239)</td>
</tr>
<tr>
<td>Employment status</td>
<td>-.034</td>
<td>(.789)</td>
</tr>
<tr>
<td>Marital status</td>
<td>-.059</td>
<td>(.757)</td>
</tr>
<tr>
<td>Perceptions of timing</td>
<td>-.065</td>
<td>(.649)</td>
</tr>
<tr>
<td>Perceived control</td>
<td>-.103*</td>
<td>(.235)</td>
</tr>
<tr>
<td>Social support</td>
<td>.005</td>
<td>(.282)</td>
</tr>
<tr>
<td>Baby's health</td>
<td>-.132**</td>
<td>(.611)</td>
</tr>
<tr>
<td>Mother’s health</td>
<td>-.105*</td>
<td>(.404)</td>
</tr>
<tr>
<td>Negative feelings during birth</td>
<td>.178***</td>
<td>(.207)</td>
</tr>
<tr>
<td>Positive feelings during birth</td>
<td>-.065</td>
<td>(.194)</td>
</tr>
<tr>
<td><strong>Direct Effects on Maternal Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.283***</td>
<td>(.137)</td>
</tr>
<tr>
<td>Education</td>
<td>.260***</td>
<td>(.146)</td>
</tr>
<tr>
<td>Employment status</td>
<td>.006</td>
<td>(.504)</td>
</tr>
<tr>
<td>Marital status</td>
<td>.168***</td>
<td>(.470)</td>
</tr>
<tr>
<td><strong>Direct Effects on Perceptions of Timing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.085</td>
<td>(.016)</td>
</tr>
<tr>
<td>Education</td>
<td>.052</td>
<td>(.017)</td>
</tr>
<tr>
<td>Employment status</td>
<td>.024</td>
<td>(.059)</td>
</tr>
<tr>
<td>Marital status</td>
<td>.198***</td>
<td>(.055)</td>
</tr>
<tr>
<td><strong>Direct Effects on Perceived Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>.105</td>
<td>(.016)</td>
</tr>
<tr>
<td>Perceptions of timing</td>
<td>.027</td>
<td>(.133)</td>
</tr>
<tr>
<td>Income</td>
<td>-.106</td>
<td>(.046)</td>
</tr>
<tr>
<td>Education</td>
<td>-.033</td>
<td>(.049)</td>
</tr>
<tr>
<td>Employment status</td>
<td>.033</td>
<td>(.162)</td>
</tr>
<tr>
<td>Marital status</td>
<td>-.041</td>
<td>(.156)</td>
</tr>
<tr>
<td>Negative feelings during birth</td>
<td>-.168***</td>
<td>(.039)</td>
</tr>
<tr>
<td><strong>Direct Effects on Social Support</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>.011</td>
<td>(.013)</td>
</tr>
<tr>
<td>Perceptions of timing</td>
<td>.059</td>
<td>(.111)</td>
</tr>
<tr>
<td>Income</td>
<td>-.019</td>
<td>(.038)</td>
</tr>
<tr>
<td>Education</td>
<td>-.048</td>
<td>(.041)</td>
</tr>
<tr>
<td>Employment status</td>
<td>-.049</td>
<td>(.135)</td>
</tr>
<tr>
<td>Marital status</td>
<td>-.047</td>
<td>(.130)</td>
</tr>
<tr>
<td>Positive feelings during birth</td>
<td>.143**</td>
<td>(.030)</td>
</tr>
</tbody>
</table>

*p< .05, **p< .01, ***p< .001
Contrary to the expected relationship proposed in Hypothesis 1, mother’s age at first birth was not significantly associated with postpartum depression ($\beta = -0.053, p = .333$). The pathways between maternal age and the proximal variables were also non-significant: perceived control during birth ($\beta = 0.105, p = .065$); social support during birth ($\beta = .011, p = .844$). Thus, Hypothesis 2a and 2b were not supported.

Inconsistent with Hypothesis 3, perceptions of being on time was not significantly associated with postpartum depression ($\beta = -0.065, p = .170$). Perceptions of being on time also did not impact perceived control during birth ($\beta = 0.059, p = .234$) or social support during birth ($\beta = 0.091, p = .071$), disconfirming Hypotheses 4a and 4b.
Three of the four structural factors were significantly associated with maternal age: income ($\beta = .283, p = .000$), marital status ($\beta = .168, p = .000$), and education ($\beta = .261, p = .000$). These estimates suggest that maternal age is positively associated with income, level of education, and marital status. In other words, as income, education, and the probability of being married increase, so does maternal age. The remaining structural variable, employment status, was not significantly associated with maternal age ($\beta = .006, p = .889$). As such, support was provided for Hypothesis 5a, 5b and 6b; Hypothesis 6a was not supported.

With respect to the relationships between the cultural factor and the structural factors, marital status is positively associated with perceptions of being on time ($\beta = .199, p = .000$). This estimate suggests that being married is associated with a higher probability of reporting an “on time” pregnancy, thus supporting Hypothesis 8b. Hypotheses 7a, 7b, and 8a were not supported, as the other structural variables were not associated with perceptions of being on time: income ($\beta = .085, p = .117$), education ($\beta = .052, p = .316$), employment status ($\beta = .024, p = .627$).

Also contrary to the expected relationships proposed in Hypotheses 9a, 9b, 10a, and 10b, the structural factors were not associated with postpartum depression: income ($\beta = -.052, p = .352$), education ($\beta = .046, p = .388$), marital status ($\beta = -.059, p = .276$), employment status ($\beta = -.034, p = .473$). The relationships between the structural factors and the proximal factors were also non-significant, disconfirming Hypotheses 11a-11d and 12a-12d. More specifically, the structural variables were not associated with perceived control during birth: income ($\beta = -.106, p = .067$), marital status ($\beta = -.041, p = .445$), education ($\beta = -.033, p = .550$), employment status ($\beta = .018, p = .511$), nor social support during birth: income ($\beta = -.019, p = .743$), marital status ($\beta = -.021, p = .701$), education ($\beta = -.048, p = .388$), employment status ($\beta = -.049, p = .333$).
My final set of hypotheses concern the relationships between the proximal variables and postpartum depression. Hypothesis 13a was not supported as level of social support was not significantly associated with PPD ($\beta = -0.005$, $p = .918$). However, Hypotheses 13b was supported as perceived control during birth was negatively associated with PPD ($\beta = -0.103$, $p = .024$). This finding indicates that higher levels of perceived control during the childbirth process are associated with lower levels of postpartum depression.

The SEM results also indicate that three of the control variables were significantly associated with PPD. Both baby’s health ($\beta = -0.132$, $p = .004$) and mother’s health ($\beta = -0.105$, $p = .030$) were negatively associated with postpartum depression. This suggests that more positive perceptions of baby’s health and mother’s health were associated with decreased postpartum depression. Negative feelings during birth ($\beta = .178$, $p = .000$) was also positively associated with PPD, indicating that as negative feelings during birth increase, postpartum depression also increases.

There are a number of additional significant paths within the final trimmed model. Negative feelings during birth was negatively associated with perceived control ($\beta = -0.168$, $p = .000$), suggesting that respondents who reported more negative feelings during birth reported lower levels of perceived control. Positive feelings during birth was positively associated with social support ($\beta = .143$, $p = .003$), which indicates that respondents who reported more positive feelings during birth reported higher levels of social support. Further, the covariance between perceptions of timing and maternal age is statistically significant ($\beta = .200$, $p = .027$). Table 6 provides a summary of my findings with respect to support for my hypotheses.
Table 6. Summary of Hypotheses

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Maternal age will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>2a Maternal age will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>2b Maternal age will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>3 Perceptions of being on time will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>4a Perceptions of being on time will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>4b Perceptions of being on time will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>5a Income will be positively associated with maternal age.</td>
<td>Supported</td>
</tr>
<tr>
<td>5b Education will be positively associated with maternal age.</td>
<td>Supported</td>
</tr>
<tr>
<td>6a Being employed will be positively associated with maternal age.</td>
<td>Not supported</td>
</tr>
<tr>
<td>6b Being married will be positively associated with maternal age.</td>
<td>Supported</td>
</tr>
<tr>
<td>7a Income will be positively associated with perceptions of being on time.</td>
<td>Not supported</td>
</tr>
<tr>
<td>7b Education will be positively associated with perceptions of being on time.</td>
<td>Not supported</td>
</tr>
<tr>
<td>8a Being employed will be positively associated with perceptions of being on time.</td>
<td>Not supported</td>
</tr>
<tr>
<td>8b Being married will be positively associated with perceptions of being on time.</td>
<td>Supported</td>
</tr>
<tr>
<td>9a Income will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>9b Education will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>10a Being employed will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>10b Being married will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>11a Income will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>11b Income will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>11c Education will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>11d Education will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>12a Being employed will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>12b Being employed will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>12c Being married will be positively associated with social support.</td>
<td>Not supported</td>
</tr>
<tr>
<td>12d Being married will be positively associated with perceived control.</td>
<td>Not supported</td>
</tr>
<tr>
<td>13a Social support will be negatively associated with PPD.</td>
<td>Not supported</td>
</tr>
<tr>
<td>13b Perceived control will be negatively associated with PPD.</td>
<td>Supported</td>
</tr>
</tbody>
</table>
Indirect and Total Effects

My theoretical model also includes several mediating pathways. In order to test for potential mediation, the indirect effects and total effects on postpartum depression were estimated. As previously noted, the indirect effect can be defined as the “pathway from the exogenous variable to the outcome through the mediator” and the total effect can be conceptualized as the “sum of the direct and indirect effects of the exogenous variable on the outcome” (Gunzler Chen, Wu, and Zhang 2013:392). The standardized coefficients and standard errors for the indirect effects pathways and total effects pathways for the final trimmed model are summarized in Table 7.

Table 7. Standardized Coefficients and Standard Errors for the Trimmed SEM Model, Indirect and Total Effects (n=427)

<table>
<thead>
<tr>
<th></th>
<th>β</th>
<th>(se)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indirect Effects on Postpartum Depression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>-.011</td>
<td>(.008)</td>
</tr>
<tr>
<td>Income</td>
<td>-.013</td>
<td>(.074)</td>
</tr>
<tr>
<td>Education</td>
<td>-.015</td>
<td>(.074)</td>
</tr>
<tr>
<td>Employment status</td>
<td>-.017</td>
<td>(.074)</td>
</tr>
<tr>
<td>Marital status</td>
<td>-.020</td>
<td>(.190)</td>
</tr>
<tr>
<td>Perceptions of timing</td>
<td>-.003</td>
<td>(.071)</td>
</tr>
<tr>
<td><strong>Total Effects on Postpartum Depression</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>-.064</td>
<td>(.078)</td>
</tr>
<tr>
<td>Income</td>
<td>-.065</td>
<td>(.218)</td>
</tr>
<tr>
<td>Education</td>
<td>.029</td>
<td>(.232)</td>
</tr>
<tr>
<td>Employment status</td>
<td>-.040</td>
<td>(.796)</td>
</tr>
<tr>
<td>Marital status</td>
<td>-.076</td>
<td>(.742)</td>
</tr>
<tr>
<td>Perceptions of timing</td>
<td>-.068</td>
<td>(.653)</td>
</tr>
</tbody>
</table>

*p< .05, **p< .01, ***p< .001
With respect to the primary pathway of interest in this investigation, the relationship between maternal age at first birth and postpartum depression, the indirect effect for this path is estimated $\beta = -.011$ ($p = .064$). This indirect effect coefficient can be conceptualized as the product of the direct effects. In other words: direct effect $\times$ direct effect = indirect effect. To illustrate, Figure 4 displays my simplified model, with social support and perceived control serving as proposed mediators in the relationship between maternal age and postpartum depression.

Figure 4. Simplied model with standardized direct effects coefficients to illustrate mediation  *$p< .05$

To calculate the indirect effect of maternal age on depression, the following formula can be used:

$$(a \times b) + (c \times d) = \text{indirect effect of maternal age on depression}$$

$$(-.105 \times .103) + (.011 \times -.005) = -.011$$
Thus, the indirect effect of maternal age on postpartum depression is $\beta = -.011$.

Combining this indirect effects coefficient with the direct effects coefficient for maternal age on postpartum depression noted earlier ($\beta = -.053$), the total effect of maternal age on depression is $\beta = -.064$. This can be conceptualized as: *direct effect* ($-.053$) + *indirect effect* ($-.011$) = *total effect* ($-.064$). While the indirect effect between maternal age and postpartum depression is approaching statistical significance ($p = .064$), the total effect of maternal age on postpartum depression is non-significant ($p = .226$).

An additional useful way to interpret these coefficients is to compute proportions and ratios using the following formulas (UCLA Statistical Consulting Group 2015):

- $\frac{\text{indirect effect}}{\text{total effect}}$ = *proportion of total effect mediated*
- $\frac{\text{indirect effect}}{\text{direct effect}}$ = *ratio of indirect to direct effect*
- $\frac{\text{total effect}}{\text{direct effect}}$ = *ratio of total to direct effect*

Utilizing the coefficients produced by my SEM estimation, I find the following:

- $\frac{\text{indirect effect} (-.011)}{\text{total effect} (-.064)}$ = *proportion of total effect mediated* (.172)
- $\frac{\text{indirect effect} (-.011)}{\text{direct effect} (-.053)}$ = *ratio of indirect to direct effect* (.208)
- $\frac{\text{total effect} (-.064)}{\text{direct effect} (-.053)}$ = *ratio of total to direct effect* (1.21)

In other words, the proportion of the total effect on depression that is mediated is .172. The ratio of the indirect effect to the direct effect is .208, indicating that the indirect effect of maternal age on depression is almost 1/4 the size of the direct effect of maternal age on depression. The ratio of total effect to direct effect (1.21) indicates that the total effect of maternal age on depression is 1.21 times the direct effect of maternal age on depression. With respect to the other mediating relationships proposed in my theoretical model, the total effects paths to postpartum depression are non-significant, as illustrated in Table 7.
Supplemental Analyses

To supplement these findings, I conducted three additional sets of analyses. Maternal age has been assessed in a number of ways in research in this area, such as on a categorical scale (e.g., Boivin et al. 2009) and as a quadratic term (e.g., Carlson 2011). Thus, my first two supplemental analyses center on exploring the impact of maternal age on PPD when assessing maternal age: (1) on a categorical scale; and (2) as a polynomial (quadratic) variable. With respect to my third supplemental analysis, moderation is an additional method used within social science research to analyze relationships among variables (Baron and Kenny 1986) and is an important component within a number of sociological frameworks, such as the stress process paradigm (Pearlin, Lieberman, Menaghan, and Mullan 1981). Therefore, I also explored alternative ways to conceptualize my theoretical relationships of interest by assessing the proximal variables of social support during birth and perceived control during birth as moderating the relationship between maternal age and postpartum depression.

Maternal Age as a Categorical Measure

For my first supplemental analysis, I explored the impact of measuring maternal age as a categorical variable. Measuring maternal age as a categorical variable follows previous research in this area (e.g., Boivin et al. 2009) and also provides an opportunity to explore whether there are important group differences that are being obscured by assessing maternal age continuously. To conduct this analysis, I divided the sample into three age categories based on the recent finding that the mean age of first-time mothers in 2013 was 26 years old (National Vital Statistics System 2015). The categories were thus: “younger” (women 18-25 years old), “average” (26-34 years old), and “older” (over 35 years old). As illustrated in Table 1, 38.64% of
my sample is between the ages of 18-25 years old (n = 182), 53.08% of the sample is between the ages of 26-34 years old (n = 250), and 8.28% of the sample reported an age of 35 years old and older (n = 39).

I then utilized a one-way analysis of variance (ANOVA) to examine the relationship between categorical maternal age and postpartum depression. The ANOVA approach is a common way to check for statistically significant differences in the mean values of a continuous variable for each category of a categorical variable (Sweet and Grace-Martin 2012). Mean scores of PPD by maternal age category in my sample were as follows: younger (women 18-25 years old) = 17.95, average (26-34 years old) = 16.48, and older (over 35 years old) = 16.21. Based on the results from the ANOVA estimation, the between groups F statistic associated with these mean values is 2.79 and the model is not statistically significant (p = .062). In other words, the three maternal age groups do not report statistically different mean levels of PPD. The $R^2$ value for this model was .01.

I then conducted a post-hoc test for this ANOVA estimation using Tukey’s HSD (honest significant difference) test, as this particular post hoc test will adjust for unequal sample sizes (StataCorp 2015). Results from this post hoc test indicate that in addition to the non-significance of the overall model, none of the differences in mean PPD scores between the three age groups are statistically significant: younger vs. average (p = .068) average vs. older (p = .970), younger vs. older (p = .311).

Following the initial ANOVA analyses, I conducted a one-way analysis of covariance (ANCOVA), controlling for the effects of the structural (income, education, marital status, employment status) and cultural (perceptions of timing) factors by adding these variables as covariates. While the overall model is now significant ($F = 2.71$, $p = .009$) and the $R^2$ value has
increased to .043, categorical maternal age remains non-significant (F = .11, p = .893). A series of post-hoc tests for the ANCOVA estimation confirmed that the differences in mean PPD levels between the age categories are not statistically significant.

**Maternal Age as a Polynomial Measure**

For my second supplemental analysis, I explored the impact of measuring maternal age as a polynomial (quadratic) term following previous research in this area (e.g., Carlson 2011). I began this analysis by squaring the maternal age variable to create a quadratic term. I then utilized SEM to re-estimate my proposed theoretical model (Figure 1). Results from this estimation were very similar to the results I obtained when maternal age was treated as a continuous variable.

The initial trimmed model using the quadratic measure of maternal age did not fit the data well: $\chi^2 = 94.46$ (df=33, N=422, p=.000), CFI=.748, RMSEA=.066. Although the RMSEA value for the model (.066) is below the traditional standard of .08, the CFI value for model (.748) is not greater than the traditional criterion of .900. The modification indices values suggested six pathways be added to improve model fit; these six pathways were the same as those suggested when maternal age was entered as a continuous variable. Also similar to the previous SEM estimation, no structural paths were suggested for baby’s age and race. I made these suggested modifications and re-estimated the model.

The final trimmed model was a better fit of the data relative to the initial model: $\chi^2 = 26.47$ (df=17, N=427, p=.066), CFI=.962, RMSEA=.036. The CFI value for the trimmed model (.962) exceeds both the traditional standard of .900 and the recently advanced criterion of .950. The trimmed model’s RMSEA value (.036) is below both the traditional standard of .080 and the
recently proposed criterion of .060. These fit statistics suggest that this model is a slightly better fit of the data than the model using the continuous measure of maternal age. However, analysis of the standardized estimates indicates minimal differences in terms of the relationships between the variables of interest.

The relationship between maternal age and PPD remains non-significant with respect to direct effects on depression (β = -.048, p = .375), indirect effects on depression (β = -.011, p = .060), and total effects on depression (β = -.059, p = .278). Three of the four structural variables remain significantly associated with maternal age: income (β = .277, p = .000), marital status (β = .150, p = .001), and education (β = .251, p = .000). In terms of direct effects, perceived control during birth (β = -.104, p = .024), negative feelings during birth (β = .178, p = .000), baby’s health (β = -.133, p = .004), and mother’s health (β = -.104, p = .031) remain significantly associated with PPD.

To summarize, assessing maternal age as a quadratic variable results in a model that represents a good fit of the data. However, with respect to the association between maternal age and PPD, this alternative approach does not produce findings significantly different than the findings produced when maternal age was measured on a continuous scale.

**Proximal Variables as Moderators**

For my final set of supplemental analyses, I explored an alternative way of conceptualizing the theoretical relationships among my variables of interest by assessing the proximal variables as moderating the relationship between maternal age and postpartum depression, rather than mediating this relationship. As defined by Baron and Kenny (1986:1174), a moderator is a variable that “affects the direction and/or strength of the relation
between an independent or predictor variable and a dependent or criterion variable.” Stated another way, moderation analysis examines whether the effect of the independent variable on the dependent variable differs across levels of another variable (the moderator) (Fairchild and MacKinnon 2009). A common way to test for moderation is to model an interaction term between the independent variable and the moderating variable (Fairchild and MacKinnon 2009). As applied to my research, this supplemental analysis examines whether the proximal variables of perceived control during birth and social support during birth moderate the effect of maternal age on postpartum depression.

To test these potential moderation effects, I utilized Ordinary Least Squares (OLS) linear regression. I first created interaction terms for maternal age and perceived control during birth, and maternal age and social support during birth. My model included postpartum depression as the outcome variable. The predictor variables for the OLS regression were specified as follows: Model 1 included maternal age and the six control variables (negative feelings during birth, positive feelings during birth, baby’s age, baby’s health, mother’s health, and race); Model 2 included the structural factors (income, education, employment status, marital status); Model 3 included the cultural factor (perceptions of the timing of the pregnancy), and Model 4 included the proximal factors (social support during birth, perceived control during birth). Finally, the full model (Model 5) added the interaction terms for maternal age and the two proximal variables. Results from this OLS estimation are summarized in Table 8.

Similar to my findings when utilizing SEM, maternal age was not associated with PPD in any of the models -- model 1: ($\beta = -0.076$, $p = 0.091$); model 2: ($\beta = -0.061$, $p = 0.267$); model 3: ($\beta = -0.054$, $p = 0.334$); model 4: ($\beta = -0.043$, $p = 0.447$); model 5: ($\beta = -0.235$, $p = 0.499$). As illustrated in Table 8, neither the structural variables nor perceptions of timing were significantly
associated with the dependent variable of PPD. But also similar to the results obtained in the SEM estimations, baby’s health, mother’s health, and negative feelings during birth were significantly associated with PPD. These coefficients suggest that as perceptions regarding baby’s health and mother’s health increased, PPD decreased, and as negative feelings during birth increased, as did PPD. With respect to the interaction terms between maternal age and the proximal variables, neither maternal age x social support (β = -.224, p = .455) nor maternal age x perceived control (β = .369, p = .397) were significantly associated with postpartum depression.

With respect to the overall model, the R² value (coefficient of determination) explains the proportion of the variance in the dependent variable explained by the predictor variables. The R² values for my estimation increased with each model: model 1 = .130; model 2 = .139; model 3 = .143; model 4 = .155; model 5 = .157. Stated another way, the independent variables in the final model explain 15.7% of the variance in PPD. To summarize this supplemental analysis, the non-significance of the interaction terms for maternal age and the proximal variables suggests that perceived control and social support are not moderating the impact of maternal age on postpartum depression as specified in this particular model.
<table>
<thead>
<tr>
<th></th>
<th>Model 1 β (se)</th>
<th>Model 2 β (se)</th>
<th>Model 3 β (se)</th>
<th>Model 4 β (se)</th>
<th>Model 5 β (se)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td>-.076 (.062)</td>
<td>-.061 (.078)</td>
<td>-.054 (.079)</td>
<td>-.043 (.079)</td>
<td>-.235 (.488)</td>
</tr>
<tr>
<td>Income</td>
<td>--</td>
<td>-.031 (.232)</td>
<td>-.028 (.232)</td>
<td>-.039 (.232)</td>
<td>-.038 (.232)</td>
</tr>
<tr>
<td>Education</td>
<td>--</td>
<td>.029 (.247)</td>
<td>.030 (.246)</td>
<td>.028 (.245)</td>
<td>.032 (.246)</td>
</tr>
<tr>
<td>Employment Status</td>
<td>--</td>
<td>-.037 (.803)</td>
<td>-.036 (.803)</td>
<td>-.033 (.800)</td>
<td>-.036 (.806)</td>
</tr>
<tr>
<td>Marital Status</td>
<td>--</td>
<td>-.049 (.794)</td>
<td>-.036 (.800)</td>
<td>-.041 (.797)</td>
<td>-.038 (.799)</td>
</tr>
<tr>
<td>Perceptions of Timing</td>
<td>--</td>
<td>--</td>
<td>-.064 (.662)</td>
<td>-.060 (.661)</td>
<td>-.062 (.663)</td>
</tr>
<tr>
<td>Perceived Control</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.110* (.239)</td>
<td>-.337 (1.37)</td>
</tr>
<tr>
<td>Social Support</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.006 (.287)</td>
<td>.201 (1.73)</td>
</tr>
<tr>
<td>Maternal Age x Social</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.224 (.063)</td>
</tr>
<tr>
<td>Maternal Age x Perceived Control</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>.369 (.050)</td>
</tr>
<tr>
<td>Baby's Health</td>
<td>-.132** (.580)</td>
<td>-.152** (.625)</td>
<td>-.149** (.625)</td>
<td>-.145** (.623)</td>
<td>-.146** (624)</td>
</tr>
<tr>
<td>Mother's Health</td>
<td>-.127** (.373)</td>
<td>-.101* (.415)</td>
<td>-.097* (.415)</td>
<td>-.103* (.414)</td>
<td>-.101* (.414)</td>
</tr>
<tr>
<td>Baby's Age</td>
<td>-.031 (.106)</td>
<td>-.031 (.114)</td>
<td>-.029 (.114)</td>
<td>-.029 (.114)</td>
<td>-.030 (.114)</td>
</tr>
<tr>
<td>Negative Feelings</td>
<td>.211*** (.197)</td>
<td>.201*** (.208)</td>
<td>.194*** (.209)</td>
<td>.176** (.210)</td>
<td>.179** (.211)</td>
</tr>
<tr>
<td>Positive Feelings</td>
<td>-.067 (.185)</td>
<td>-.069 (.198)</td>
<td>-.073 (.198)</td>
<td>-.068 (.199)</td>
<td>-.067 (.199)</td>
</tr>
<tr>
<td>Race (1=white)</td>
<td>-.098* (.710)</td>
<td>-.097* (.776)</td>
<td>-.092 (.777)</td>
<td>-.087 (.776)</td>
<td>-.089 (.778)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.130</td>
<td>.139</td>
<td>.143</td>
<td>.155</td>
<td>.157</td>
</tr>
</tbody>
</table>

*** p ≤ .000 ; ** p ≤ .01 ; *p ≤ .05
CHAPTER FIVE

DISCUSSION

In this final chapter I offer discussion of my findings regarding the relationship between maternal age at first birth and postpartum depression. I first provide an overview of my dissertation research and a summary of my key findings. I then offer discussion regarding the theoretical contributions and implications of my research. This chapter concludes with a discussion of the limitations of this study, and suggestions concerning directions for future research in this area.

Key Findings

In this dissertation research I examined the relationship between maternal age at first birth and postpartum depression, with a specific focus on the structural and individual level factors that contribute to this relationship. Insights from two social psychological approaches, the life-course perspective and the social structure and personality framework (SSP), informed my exploration of the connections between social position and personal resources in the context of this important transition. Data from a national survey on motherhood, Listening to Mothers II: Second National U.S. Survey of Women’s Childbearing Experiences (LTMII) (Childbirth Connection 2006) were analyzed to examine these theoretical relationships.
Maternal Age and PPD

With respect to my primary relationship of interest, my findings indicate that contrary to expectations, maternal age was not significantly associated with PPD for the women in my sample. Though this finding is inconsistent with my hypothesized relationship, this result is consistent with some existing research in this area. As previously discussed, the literature concerning the relationship between maternal age and PPD has been mixed with researchers finding evidence that younger parents are at increased risk for PPD (Katon, Russo, and Gavin 2014), older parents are at increased risk for PPD (Boivin et al. 2009), there is a curvilinear relationship between maternal age and PPD (e.g., Mirowsky and Ross 2002), and maternal age is not associated with PPD (e.g., McMahon, Boivin, Gibson, Hammarberg, Wynter, and Fisher 2015). My results are consistent with the latter line of research which suggests that maternal age is unrelated to PPD. This finding is also consistent with previous research using the LTMII data set. For example, in Beck and colleagues’ (2011) examination of postpartum depression rates among the LTMII respondents, maternal age was not associated with PPD.

Structural and Cultural Factors

In line with the life-course and SSP perspectives, I expected structural and cultural factors to help explain the relationship between maternal age and PPD. Contrary to expectations, the structural factors of income, education, employment status, and marital status were not significantly associated with PPD for the women in my sample. Again, while this finding is inconsistent with research on the relationship between structural factors and distress generally (e.g., McLeod and Kessler 1990; Turner, Wheaton, and Lloyd 1995), and postpartum depression in particular (e.g., Katon, Russo, and Gavin 2014; O’Hara and Swain 1996), it is consistent with
previous research utilizing this data set. As discussed in the previous paragraph, in Beck and colleagues’ (2011) research with the LTMII data, maternal age was not significantly associated with PPD; such structural factors as marital status and income were also unrelated to PPD in this examination.

Although not related to the ultimate dependent variable, my results do suggest some important relationships between maternal age and the structural factors. In particular, income, education, and marital status were positively associated with maternal age such that older mothers were more likely to have a higher income, higher levels of education, and a higher probability of being married. These findings correspond with the existing literature, as previous research has consistently demonstrated that older parents differ from younger parents on a number of demographic characteristics, including education, income, and marital status (Boivin et al. 2009; Pew Research Center 2010; Roosa 1998).

Additionally, my results suggest that marital status (i.e., being married) was associated with perceptions of being “on time” with one’s pregnancy. This finding is compelling in that it suggests that there is something particularly influential about being married (relative to the other structural factors) that conditions whether or not a mother feels that their pregnancy was “on time.” Principles from the life-course and SSP perspectives point to the complex relationships between structural and cultural factors; exploring how marriage may operate in a distinct way toward influencing perceptions of pregnancy timing is an important next step in terms of integrating these two frameworks.

While marital status was associated with mothers’ perceptions of the timing of their pregnancy, timing was not associated with PPD in my study. Life-course researchers have recently argued that the success of a major life transition may not be dependent on the age at
which the transition occurs (or whether the transition was disordered or non-normative), but rather perceptions of well-being following a transition are dependent on the “degree to which social environments permit individuals to implement their behavioral choices” (George 1996: 253). One such way that this might be conceptualized is by examining whether women felt as if it was the “right time” to become pregnant, and whether these beliefs influenced their psychological adjustment during the transition to parenthood. However, for my sample, perceptions of whether the respondents felt that they were on time with their pregnancy was not associated with their levels of depression during the postpartum period.

**Proximal Factors**

While my findings regarding the structural and cultural components of my model did not correspond to expectations, they do suggest that proximal factors may be important to consider in research examining PPD. Among the variables considered in my theoretical model, the most important influences on new mothers’ postpartum mental health was perceived control during childbirth (i.e., mother’s perceived control regarding such issues as patient rights about medical procedures, decision making processes, and potential complications during birth), as well as negative feelings during childbirth (i.e., feeling agitated, groggy, frightened, helpless, overwhelmed, and weak), baby’s physical health (i.e., perceptions of baby’s health as poor, fair, good, or excellent), and maternal physical health (i.e., perceptions of one’s health as poor, fair, good, very good, or excellent). More specifically, my findings show that mothers who reported higher levels of perceived control during birth, more positive perceptions regarding one’s health, and more positive perceptions regarding the health of one’s baby, reported lower levels of PPD;
mothers who reported more negative feelings during the childbirth process reported higher levels of depression postpartum.

Conclusions and Implications

The goal of this research was to re-visit the relationship between maternal age at first birth and postpartum depression. While I did not find support for many of my hypothesized relationships, I believe there are a number of ways in which this research contributes to the growing literature regarding PPD among new mothers. First, by examining mothers’ experiences during the critical postpartum period, my findings indicate that several aspects of the childbirth process are related to maternal mental health postpartum. Second, as a concurrent application of the life-course and SSP frameworks, this dissertation extends existing work in this area, particularly with respect to the importance of proximal contexts. Third, my findings revealed the important connections between maternal physical well-being and psychological well-being during the transition to parenthood. I discuss each of these contributions in greater detail below.

The Importance of Positive Childbirth Experiences

The existing literature suggests that perinatal mood and behavior are linked with postpartum mental health outcomes for new parents (e.g., Beck 2001; O’Hara and Swain 1996). Researchers have also found that a perceived positive childbirth experience is related to a number of positive outcomes in the postpartum period (e.g., Dencker et al., 2010). Given this, understanding the experiences of new mothers as they undertake the transition to parenthood is an important goal for research in this area. Yet, new mothers are a population that has been difficult to access, and this has resulted in this group, particularly women entering motherhood at
older ages, remaining an understudied population within the social sciences (Carolan 2005; McMahon et al. 2015). This issue of access has also contributed to much of the work in this area being comprised of retrospective accounts. The Listening To Mothers II data set provided me with an opportunity to examine the experiences of new mothers as they actually experience the transition to parenthood.

To that end, my results suggest that several factors associated with the childbirth process, such as negative feelings during birth and perceived control during birth, matter toward mothers’ psychological well-being during this transitional period. Though I can only speculate, it is possible that the importance of perceived control during birth and negative feelings during birth may not have been captured if mothers’ accounts were measured several years after childbirth. Thus, by examining observations assessed during the critical postpartum period, this dissertation research represents one important step toward enhancing our understanding of the dynamic transition to parenthood period and of the consequence of childbirth experiences on maternal mental health. And though this contribution may be primarily methodological in nature, my findings regarding the importance of positive childbirth experiences also has implications toward the designing of policies and interventions to better assist families during this challenging time.

**The Importance of Proximal Contexts**

To create my theoretical model I drew on insights from both the life-course and the SSP perspectives. Thus, this research represents a concurrent application of these frameworks that has been suggested as an important next phase toward extending each theoretical perspective (George 1996; McLeod and Lively 2006). My findings regarding the importance of perceived control to postpartum depression represent a step in this direction.
Life-course researchers have recently noted that the impact of major role transitions is shaped by the social and psychological resources and responses of the individual (Furstenberg 2005). As applied to my research, it was expected that the social and psychological resources of perceived control during birth and social support during birth would influence new mothers’ postpartum mental health. The importance of these types of resources is also emphasized within the SSP framework, in that the SSP principles draw attention to understanding how individuals perceive, process, and attribute meaning to the macro-structure and to their experiences within proximal contexts (McLeod and Lively 2006).

Consistent with these theoretical insights concerning the importance of proximal experiences, my results suggest that perceived control during the childbirth process is associated with maternal mental health in the postpartum period. Mothers’ level of perceived control could also be considered as indicative of the extent to which they feel able to exercise agentic action, an additional important component of both the life-course and SSP frameworks (Elder 1998; Schnittker 2013). This finding also corresponds with empirical work concerning perceived control and distress generally (e.g., Gecas 1989; Pearlin, Menaghan, Lieberman, and Mullan 1981) and perceived control and postpartum depression in particular (Keeton, Perry-Jenkins and Sayer 2008). While perceived control during the childbirth process did not moderate or mediate the relationship between maternal age and PPD in my research, this finding highlights that personal (psychological) resources as processed by individuals in proximal contexts is important to new mothers’ mental health during the transition to parenthood.

My results also indicate associations between the feelings during birth variables and the proximal factors. More specifically, I found that negative feelings during birth was negatively associated with perceived control, suggesting that respondents who reported more negative
feelings during birth also reported lower levels of perceived control. Positive feelings during 
birth was positively associated with social support, which indicates that respondents who 
reported more positive feelings during birth also reported higher levels of social support. In 
addition to having implications toward the importance of a positive child birth experience 
discussed above, these findings are also suggestive in terms of how factors occurring in proximal 
contexts can interact to influence postpartum mental health.

The Importance of Physical Health

A third contribution of this research concerns my finding regarding the influence of 
mother’s physical health and baby’s physical health on postpartum psychological well-being. 
More specifically, I found that positive perceptions of one’s health and the health of one’s baby 
were associated with decreased PPD. Both of these findings are consistent with the extant work 
in this area. With respect to baby’s health, caring for an infant with medical problems has been 
found to increase maternal risk for developing postpartum depression (Ueda, Yamashita, and 
Yoshida 2006). Mothers suffering from depression may be also biased in their reporting of 
infant characteristics in terms of the attribution of negative characteristics (Robertson, Celasun, 
and Stewart 2003). Poor maternal physical health has also been consistently identified as a risk 
factor of PPD (Brown and Lumley 2000; Redshaw and Henderson 2013; Wang et al. 2011).

Moreover, my finding regarding the influence of maternal physical health on PPD 
corresponds with a broader line of research supporting the important connections between 
physical well-being and mental well-being (e.g., Sowers, Rowe, and Clay 2009). For instance, 
there is considerable evidence that supports the comorbidity of psychological and physical health 
disorders (Cohen and Rodrriquez 1995). Researchers have advanced a number of explanations to
account for the relationship between physical and mental health. In one example, Cohen and Rodriquez (1995) theorize that affective disorders are linked with physical disorders through such processes as biological pathways, behavioral pathways (e.g., poor health practices, non-adherence to treatment), cognitive pathways (e.g., biased health decision making), and social pathways (e.g., losing access to a social network).

Physical disorders are also linked with affective disorders through such mechanisms as direct biological pathways (e.g., hormonal imbalances), indirect biological pathways (e.g., sleep disturbances), behavioral pathways (e.g., maladaptive coping), cognitive pathways (e.g., self-esteem threats), and social pathways (e.g., adverse impacts on role functioning) (Cohen and Rodriquez 1995). Although my study did not include a direct test of these specific pathways and mechanisms, my findings are consistent with the larger body of research that suggests that there are important connections between physical health and mental health that should be explored when examining PPD more generally. These findings also suggest that there are numerous influences impacting new mothers’ psychological well-being during the critical transitional period.

As the life-course and SSP perspectives both offer a framework for understanding the consequences of major life transitions, they can be extended to include consideration to the important influence of physical health on maternal distress during the transition to parenthood. For example, exploring different ways of conceptualizing or modeling these relationships, such as whether maternal physical health and baby’s health mediate the relationship between maternal age and PPD, might provide a more complete picture of the relationships among maternal age, structural factors, and postpartum mental health.
Limitations and Directions for Future Research

Although this research adds to the existing literature concerning the relationship between maternal age at first birth and postpartum depression, this study also has limitations that should be taken into consideration when interpreting the findings. First, there are several limitations associated with this data set and sample that may limit how broadly the findings can be generalized. Second, there are potential limitations associated with the construction of the social support and employment status variables. In what follows I discuss each of these limitations in more detail. I also offer suggestions for future research in this substantive area.

Sample and Data Limitations

The Listening to Mothers II data set was ideal for the purposes of my research for several reasons as detailed in previous chapters; however, there are limitations of the data that are important to consider. First, there are aspects of the sample that limit how broadly the findings can be generalized. The mode of survey administration used in this research was a web (online) survey. Online surveys have a number of strengths. For example, a key advantage of an online survey is that the interview is self-administered. When assessing topics that may prove threatening or sensitive to the respondent, such as questions regarding mental states and emotions, a self-administered survey is generally considered to be most appropriate (Bradburn, Norman, Sudman, and Wansink 2004). On a related note, a self-administration mode also helps to decrease social desirability bias (Bradburn et al. 2004). However, online surveys also have several disadvantages. First, this mode of administration restricts the sample to individuals that have access to a computer and an internet connection (Groves, Fowler, Couper, Lepkowski, Singer, and Tourangeau 2009). Similarly, this mode restricts the sample to those individuals that
have attained a certain level of computer skills or computer literacy (Dillman 2007). As such, these restrictions can act as significant sources of coverage error for this mode of survey administration (Dillman 2007; Groves et al. 2009).

To account for this potential source of sampling error, the LTMII online surveys were supplemented with interviews conducted via telephone in which the primary investigators “took special efforts to ensure a representative national sample through over sampling of mothers who were ethnic minorities” (Declercq, Sakala, Corry, and Applebaum 2006:8). Unfortunately for the purposes of my research, survey questions relating to key variables of interest (social support during birth and perceived control during birth) were not administered to the telephone respondents, which necessitated restricting my sample to the online respondents. As discussed in Chapter Three, there were significant differences between the online and telephone respondents on many of the key variables, including maternal age and the structural factors.

Further, eligibility criteria for the LTMII survey included women between the ages of 18-45 years old who had given birth to a single child in a U.S. hospital in 2005, with these surveys conducted in English. The restriction of my sample to online respondents as well as the LTMII eligibility criteria limits how broadly these findings can be generalized. Examining the relationship between maternal age and PPD in more diverse samples remains an important future direction for research in this area.

An additional limitation of this data set concerns the cross-sectional nature of the observations. Although my research offers some insight into the relationship between maternal age and PPD, it is important to note that the cross-sectional research design does not allow me to rule out the possibility of reverse causality. For example, my results suggest that experiencing negative feelings during birth is associated with increased PPD. However, it is conceivable that
a new mother’s postpartum mental health state is influencing her memories of her experiences during the childbirth process. Further, the causal patterns between social support, perceived control, and feelings during birth is difficult to determine with cross-sectional data, and it is possible that using alternative measures of these concepts would provide a different picture concerning the influence of proximal factors. Similarly, I cannot rule out the possibility of social selection effects within my sample.

The cross-sectional nature of my data may also help to explain, in part, the lack of support regarding the importance of perceptions of pregnancy timing on PPD. As detailed in Chapter Three, this survey question was worded: “Thinking back to just before you got pregnant, did you want to be pregnant…?” Although respondents are being asked to “think back” to the time before they were pregnant, this question was asked following the birth of the baby, when respondents might have been subject to an array of factors influencing how they felt (or recalled) their pre-pregnancy experiences. In this sense, my measure of mothers’ perceptions of timing is not comparable to previous research, such as Carlson (2011), who utilized longitudinal data to assess the relationship between mothers’ deviations from expected age at first birth and depression. Including observations of the mental health statuses of individuals prior, during, and following the transition to parenthood would allow researchers to more closely examine causation and selection processes.

There are also important theoretical advantages to examining my proposed model with longitudinal data. Both the life-course and SSP frameworks focus on dynamic processes. For example, research within the life-course perspective typically centers on such topics as union formation patterns (e.g., Carlson, McLanahan, and England 2004) and the tracing of life pathways as individuals transition into and out of social roles (e.g., Frech and Damaske 2012).
And while life-course researchers typically explain the relationship between social position and depression from a social causation perspective (e.g., Muntaner, Eaton, Miech, and O’Campo 2004), investigations have also found evidence supporting the influence of social selection effects (e.g., Amato and Kane 2011). In addition to providing clarification regarding the relative influence of these complex processes, examining the relationship between maternal age and PPD longitudinally would also provide an opportunity to focus on “lives in motion” (Elder 1998: 7) as new mothers experience this critical transitional period.

Finally, the LTMII data does not include numerous sociological and social psychological variables that might have otherwise been central to this study. Previous research suggests that such psychological factors as self-esteem (e.g., Beck 2001), parenting efficacy (e.g., Biehle and Mickelson 2011; Gross and Marcussen 2016), and such personality characteristics as level of interpersonal sensitivity and neuroticism (Boyce, Parker, Barnett, Cooney, and Smith 1991; Matthey, Barnett, Ungerer, and Waters 2000) can influence the mental health adjustment of new parents during the transition to parenthood. The data also does not include variables to assess maternal beliefs surrounding the role of motherhood, which researchers have highlighted as an important factor that can condition the consequences of a major life transition. For example, researchers have detailed the processes by which beliefs regarding the importance of marriage can influence the mental health impact of marital transitions (Simon and Marcussen 1999), and beliefs regarding the importance of motherhood can influence women’s fertility intentions (McQuillan, Greil, Shreffler, and Bedrous 2015). Thus, although the LTMII provides a unique opportunity to examine the transition to parenthood experiences of new mothers in the US (Declercq, Sakala, Corry, and Applebaum 2006), future investigations should be directed toward
examining the association between maternal age, postpartum depression, and relevant psychosocial variables not included in this data set.

**Measurement Limitations**

The approaches I used to measure the concepts of social support and employment status could also be considered potential limitations of this research. Social support is classically conceptualized in social psychological work that draws on my theoretical perspectives. For instance, within the stress process paradigm, social support is considered an important social resource that can mediate or moderate the relationship between the source of stress and the manifestation of stress (Pearlin et al. 1981). However, with the exception of positive feelings during the childbirth process, social support was not significantly associated with the variables proposed in my theoretical model.

This may be due, in part, to the operationalization of social support that I employed. Previous research has highlighted the importance of examining both the quantity and quality of the social support received by mothers during childbirth (Ross-Davie, Cheyne, and Niven 2013). Although the structure of the LTMII variables made assessment of social support quality difficult, this is an important direction for future investigations in this area. Assessment of the social support that mothers receive during pregnancy, as well as at other stages during the transition to parenthood, is an additional important direction for research in this area. Future work should ideally look at both the quantity of social support as well as the quality of social support received by mothers at multiple time points (e.g., during pregnancy, at childbirth, during postpartum) as they experience this transition.
While I did find support for my hypothesis concerning the effect of perceived control during childbirth on postpartum depression, it is worth noting that I may have found more support overall for the influence of the proximal factors—particularly with respect to mediating or moderating the relationship between maternal age and PPD—if my measures of these concepts more closely paralleled those traditionally used within the life-course and SSP literatures. For example, in SSP research, perceived control is typically conceptualized and measured as a more generalized aspect of one’s personality or self-concept. My results suggest that perceived control during the specific situation of childbirth matters to postpartum mental health; to extend this further, future research should focus on assessing new mothers’ generalized sense of control in addition to personal control exercised within specific contexts.

My measurement of employment status may also explain, in part, why this variable was the only structural factor not positively associated with maternal age. The LTMII data set includes a question regarding current (at the time of the survey) employment status, but as I was attempting to assess whether respondents occupy the role of “worker”, I elected to use the pregnancy employment measure in the event that respondents were not employed at the time of the survey due to such factors as maternity leave or medical complications resulting from childbirth. As illustrated in Table 4, income and employment were significantly positively correlated, indicating that being employed during pregnancy was associated with higher levels of income. However, it is possible that an employment status of “not employed” while pregnant could instead suggest a higher SES than an employment status of “employed” (i.e., one occupies an SES that allows for non-employment during pregnancy). Therefore, future research should be directed toward alternative ways of conceptualizing and measuring new mothers’ employment status during this transitional period. Examining the impact of maternity leave receipt and
quality also represents an important avenue for future research in this substantive area. Such future investigations should also consider a sharper focus on the relationship between maternal and paternal experiences during the transitional period as a contributing factor to PPD.

*Paternal Postpartum Distress and Couple Analysis*

The experiences of fathers during the transition to parenthood remains an understudied area. Research that has included both parents highlights important gender differences in the ways that men and women experience this critical transition (e.g., Cowan et al. 1985). Researchers have also found that new fathers are at an elevated risk of depression relative to men as a general population (Paulson and Bazemore 2010). Further, with respect to my research question regarding the relationship between age and PPD, U.S. fathers are also delaying their entry into parenthood. More specifically, recent estimates indicate that the average age of new fathers in the U.S. had increased to 27.4 years old by 2010, up from 25.3 years old in 1987 (National Center For Family and Marriage Research 2011). Given the potential gender differences in transition experiences, the elevated risk of PPD faced by new fathers, and the recent trend toward delaying fatherhood, directing empirical attention to the experiences of new fathers is an important aim for future research in this area.

Previous research also suggests that relational characteristics can play an important role during the transitional period. The transition to parenthood has been associated with a number of adverse changes for couples, such as decreased relationship functioning and quality (Doss, Rhoades, Stanley and Markman 2009) and increased marital conflict (White and Booth 1985). For example, Don and Mickelson (2012) found the relationship between maternal and paternal PPD to be indirect in nature, operating primarily through reduced relationship satisfaction and
impaired spousal support. This line of research illustrates that there are important relational dynamics that can serve to condition parents’ mental health adjustment in the postpartum period. Future research should continue to be directed toward understanding how couples experience and navigate this transition.

Finally, although this dissertation is focused more specifically on theoretical contributions, there are some potential policy and intervention implications suggested by my findings. As previously discussed, my results indicated that two factors related to the childbirth process, perceived control during birth and negative feelings during birth, and two factors related to physical health, baby’s health and maternal health, were linked with mothers’ psychological well-being in the postpartum period. Therefore, my findings suggest that policies and interventions should be crafted toward enhancing the childbirth experiences of mothers and toward improving the physical health of both new mothers and their children. Given the range of adverse short-term and long-term consequences associated with PPD (Beck 1998), the development of interventions to better assist families as they experience this transition is an important endeavor.

Conclusions

In this dissertation project I examined the relationship between maternal age at first birth and postpartum depression, with a specific focus on the structural and individual level factors that contribute to this relationship. More specifically, I explored a range of structural, cultural, and proximal factors that might serve to condition the impact of maternal age on PPD. My examination of these factors was guided by a concurrent application of two social psychological perspectives, life-course theory and the SSP framework.
With respect to postpartum mental health among new mothers, my findings highlight the important connections between physical health and mental health, with both mother’s health and baby’s health associated with maternal psychological well-being. My results also suggest that two aspects of the childbirth process, negative feelings during birth and perceived control during birth, are associated with PPD, emphasizing the significance of positive childbirth experiences. Postpartum depression is a serious and pervasive condition. This research offers a step toward enhancing our understanding of maternal distress during the critical transition to parenthood period.
REFERENCES


StataCorp. 2013. *Stata Statistical Software: Release 13*. College Station, TX: StataCorp LP.


APPENDIX A

Table 9. Demographic Characteristics of the Telephone Respondents (n=77)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent/ Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age (in years)</td>
<td>26.04 (5.50)</td>
<td>18-43</td>
</tr>
<tr>
<td>Postpartum Depression</td>
<td>16.73 (6.59)</td>
<td>7-34</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>1.30%</td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>7.79%</td>
<td></td>
</tr>
<tr>
<td>High school degree (or GED)</td>
<td>19.48%</td>
<td></td>
</tr>
<tr>
<td>Associate’s degree</td>
<td>12.99%</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>28.57%</td>
<td></td>
</tr>
<tr>
<td>College degree</td>
<td>15.58%</td>
<td></td>
</tr>
<tr>
<td>Some graduate school</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Graduate school degree</td>
<td>14.29%</td>
<td></td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $15,000</td>
<td>22.08%</td>
<td></td>
</tr>
<tr>
<td>$15,000-24,999</td>
<td>10.39%</td>
<td></td>
</tr>
<tr>
<td>$25,000-34,999</td>
<td>20.78%</td>
<td></td>
</tr>
<tr>
<td>$35,000-49,999</td>
<td>11.69%</td>
<td></td>
</tr>
<tr>
<td>$50,000-74,999</td>
<td>6.49%</td>
<td></td>
</tr>
<tr>
<td>$75,000-99,999</td>
<td>10.39%</td>
<td></td>
</tr>
<tr>
<td>$100,000 or more</td>
<td>10.39%</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
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<td></td>
</tr>
<tr>
<td>Unmarried with no partner</td>
<td>11.69%</td>
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</tr>
<tr>
<td>Unmarried with a partner</td>
<td>37.66%</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>50.65%</td>
<td></td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>33.77%</td>
<td></td>
</tr>
<tr>
<td>Yes (part time)</td>
<td>16.89%</td>
<td></td>
</tr>
<tr>
<td>Yes (full time)</td>
<td>49.35%</td>
<td></td>
</tr>
<tr>
<td>Perceptions Regarding Timing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not want to be pregnant</td>
<td>10.39%</td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant sooner</td>
<td>15.58%</td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant later</td>
<td>40.26%</td>
<td></td>
</tr>
<tr>
<td>Wanted to be pregnant at that time</td>
<td>32.47%</td>
<td></td>
</tr>
<tr>
<td>Race</td>
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<td></td>
</tr>
<tr>
<td>White</td>
<td>11.69%</td>
<td></td>
</tr>
<tr>
<td>African American or Black</td>
<td>51.95%</td>
<td></td>
</tr>
<tr>
<td>Native American or Alaskan Native</td>
<td>2.60%</td>
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</tr>
<tr>
<td>Mixed Racial Background</td>
<td>7.79%</td>
<td></td>
</tr>
<tr>
<td>Other Race</td>
<td>19.48%</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>54.55%</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

Postpartum Depression Screening Scale-Short Form (PDSS)
(Beck and Gable 2002)

Below is a list of statements describing how a parent may feel after the birth of her baby. Please indicate if you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with each statement. Please select the answer that best describes how you have felt during the past 2 weeks.

1. I had trouble sleeping even when my baby was asleep.
2. I got anxious over even the littlest things that concerned my baby.
3. I felt like my emotions were on a roller coaster.
4. I felt like I was losing my mind.
5. I was afraid that I would never be my normal self again.
6. I felt like I was not the mother I wanted to be.
7. I have thought that death seemed like the only way out of this living nightmare.

1= Strongly disagree  2= Disagree  3= Neither agree nor disagree  4= Agree  5= Strongly agree
APPENDIX C

Perceived Control during the Childbirth Process Sum Scale

1. While pregnant and giving birth, a woman has the legal right to receive clear and full explanations of any procedure, drug, or test offered to her -- including benefits, risks and alternatives. During the time you were pregnant and giving birth…”
   3=Did you fully understand that you had this legal right
   2=Did you have some knowledge about this right but didn’t know the details
   1=Did you not know that you had this legal right.

2. While pregnant and giving birth, a woman has the legal right to accept or refuse any procedure, drug, or test offered to her. During the time you were pregnant and giving birth…”
   3=Did you fully understand that you had a right to accept or refuse
   2=Did you have some knowledge but didn’t know the details
   1=Did you not know that you had this legal right.

3. Assuming there are no medical complications, who should make most decisions about your labor and birth experience?
   4=I should make decisions after considering the advice of my caregivers
   3=I should share decision making with my caregivers
   2=My caregivers should make the decisions after consulting with me
   1=My caregivers should make the decisions