Effects of maternal depression and cognitive readiness to parent on children's social emotional outcomes

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Effects of maternal depression and cognitive readiness to parent on children’s social emotional outcomes

by

Lyndsay Tystahl

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Human Development and Family Studies

Program of Study Committee:
Kere Hughes-Belding, Major Professor
   Jennifer Margrett
   Amy Popillion

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Ames, Iowa

2011

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Abstract

Approximately 60% of mothers experience some form of depression (Lanzi, 2009). Depression affects not only maternal responses, but also children’s social emotional outcomes (Hwa-Froelich, 2008; Weinberg, 2008). Low levels of cognitive readiness to parent are also associated with high levels of externalizing and internalizing behaviors in children (Miller, 1996). For this study, risk factors associated with poor social emotional outcomes of children were examined in a sample of primiparous, first time, mothers. The association between depression and children’s social emotional outcomes along with the mediating relationship of depression on cognitive readiness to parent and children’s social emotional outcomes were examined. Prenatal and twenty four month data were used from the Parenting for the First Time Project (N=397). Associations between maternal depression and children’s social emotional development were addressed through tests of correlations. The mediating relationship of depression on cognitive readiness to parent and children’s social emotional outcomes was analyzed through a series of linear regression procedures. Findings showed that increased levels of maternal depression were positively related to increased levels of externalizing and internalizing behaviors. However, results indicated that depression did not fully mediate the relationship between cognitive readiness to parent and children’s social emotional outcomes. The results provided evidence for the importance of instilling a holistic, systems approach to working with depressed mothers and their children. Further research should continue to investigate the dynamic relationships between these variables.
Chapter 1. Introduction

Rationale

Almost 60% of first time mothers experience at least some form of depression (Lanzi, 2009). Children of depressed mothers may be at particular risk of remaining unable to regulate their emotions. While children’s difficult temperament is the most important predictor of later depression, lifetime maternal depression is the second most important predictor of depression and anxiety symptoms in children (Cote, 2009). Mothers with depression tend to have more critical and hostile interactions with their infants (Hwa-Froelich, 2008). Because of this, infants whose mothers are depressed demonstrate more immature emotional regulation and higher levels of negative emotionality (Feldman, 2009). Evidence suggests that emotional regulation skills tend to be stable over the life course (Hoffman, 2006).

Children whose mothers are chronically depressed have the lowest levels of social competence and the highest levels of externalizing behaviors (Ashman, 2008). Externalizing behaviors are described as negative behaviors that are demonstrated in the outward actions of children on the external environment. Examples of externalizing behaviors may include disruption, hyperactivity, and aggression (Liu, 2004).

Cognitive readiness to parent refers to prenatal cognitions about parenting attitudes, parenting knowledge, and appropriate parenting strategies, as well as knowledge of child development (Miller, 1996). Low cognitive readiness to parent is also associated with high levels of externalizing and internalizing behaviors in children with adolescent mothers (Miller, 1996). While externalizing behaviors refer to outward actions, internalizing behaviors refer to problems that affect the child’s internal psychology. Examples of
internalizing behaviors include withdrawal, anxiety, inhibition, and depressive symptoms (Liu, 2004). One factor that leads to lower levels of cognitive readiness to parent is decreased maternal education (Sommer, 1993). Maternal education and maternal depressive symptoms indirectly affect behavioral regulation in children through decreased access to resources which promote behavioral regulation and also through decreased levels of emotional availability to encourage interactions that foster behavioral regulation (Sektnan, 2010).

Additionally, negative parental perceptions of how their children are developing are associated with lower than average developmental outcomes. These effects are seen as early as six months of age (Glascoe, 2010). Positive social skills of children early in life predict later peer acceptance (Blandon, 2010). This highlights the importance of fostering positive emotional development from a very early age. It is vital for researchers to more closely examine the interactions of maternal depression, cognitive readiness to parent, and children’s social emotional outcomes.

**Research Questions**

The research questions in this study are: (1) Are prenatal maternal depression and cognitive readiness to parent related to children's social emotional development at 24 months? I hypothesized that higher scores of maternal depression as measured by the Beck Depression Inventory (Beck, 1961) and lower levels of cognitive readiness to parent would correlate with higher levels of externalizing and internalizing behaviors as measured by the Infant-Toddler Social Emotional Assessment (Carter, 2002). (2) Does maternal depression mediate the relationship between maternal cognitive readiness to parent and children’s social
emotional outcomes at 24 months? I hypothesized that maternal depression would mediate the relationship with maternal cognitive readiness to parent and children’s social emotional development, as shown by Figure 1 below.

**Figure 1**  
*Depression as a Mediator*

Model A

Cognitive Readiness → c → Social Emotional Outcomes

Model B

Cognitive Readiness → Depression → Externalizing  
\( a \) → \( b \) \( c' \)

**Thesis Organization**

This thesis includes literature regarding maternal depression’s impact on parenting behaviors, and children’s social emotional well-being, as well as mothers’ cognitive readiness to parent. Following a review of the existing literature, the methods are presented, including participant information, procedures, and measures used. Results are reported followed by a discussion of the results and a general conclusion.
Chapter 2. Literature Review

Maternal Depression and Parenting Behaviors

Depression is an illness that interferes with normal functioning in everyday life (National Institute of Mental Health, 2009). Depression hinders a person’s ability to sleep, work, eat, and enjoy activities (National Institute of Mental Health, 2009). It often recurs throughout the lifetime (National Institute of Mental Health, 2009). Almost 60% of primiparous, first time, mothers experience some level of depression (Lanzi, 2009). Approximately one in every six adolescent females experiences major depressive disorder with the average episode lasting about five months. Additionally, one in five girls demonstrates symptoms of minor depression (Rohde, 2009). These statistics demonstrate the high percentage of women who experience depression at some point in their lives.

Depression affects maternal caregiving through parenting behaviors, such as warmth, sensitivity, and responsiveness (Lanzi, 2009). Mothers with depression have more critical and hostile interactions with their infants (Hwa-Froelich, 2008). Emotional regulation is the ability of oneself to control the behaviors associated with their emotion (Tronick & Reck, 2009). The limited mutual regulation of emotions between depressed mothers and their children fosters negative affect and stress, which are reproduced in new situations. Therefore, children who experience hostility and a lack of warmth or sensitivity will also demonstrate those behaviors in situations with their peers and other adults (Tronick & Reck, 2009). These infant and toddler responses are learned in part from maternal behavior (Lanzi, 2009; Hwa-Froelich, 2008; Tronick & Reck, 2009).
This may be due to the fact that there is a connection between maternal scaffolding and the ability of children to regulate their negative emotions in stressful situations. Maternal scaffolding occurs when mothers provide age appropriate problem-solving strategies to children. The ability of children to emotionally regulate and learn behavioral competence is essential during the early years of life (Burnier, 2010). Maternal depression creates a deficit of scaffolding through an absence of supportive emotional presence and ineffective methods of meeting emotional needs. When mothers are not emotionally available and are unable to effectively motivate and teach emotional competence, children are more likely to develop poor emotional competence (Hoffman, 2006). Because of this, infants whose mothers are depressed are more likely to demonstrate immature emotional regulation and higher levels of negative emotionality (Feldman, 2009). As evidence suggests, there is stability in emotional regulation across the life course (Hoffman, 2006), children of depressed mothers may be at particular risk for remaining unable to regulate their emotions.

Communications theory, a sub theory of systems theory, claims that non-verbal communication conveys affect, which is the emotional component of communication (White & Klein, 2008). Since depression compromises a person’s emotions, depressed mothers are less able to effectively communicate their emotions (Tronick & Reck, 2009). Mothers with depression initiate communication less often and have more negative affect toward their infants (Hwa-Froelich, 2008). Depressed mother demonstrate less eye and also show less responsiveness to their infants (Hwa-Froelich, 2008). Adolescent mothers, in particular, perform worse on responsiveness due to depression (Lanzi, 2009). These behaviors affect
mother-child attachment and interactions. It is important to consider the differences in adolescent parenting as compared to adult parenting because of unique stressors and the unique developmental period of adolescence. The egocentric nature of the adolescent period also makes it more likely that mothers may be less responsive to their infant’s needs (O’Callaghan, 1999). Therefore, children of adolescent parents are more at risk for negative social emotional outcomes (Lanzi, 2009; Hwa-Froelich, 2008).

According to systems theory, all parts of the familial system are interconnected; therefore, we must view the whole family to understand the context of what happens within those relationships (White & Klein, 2008). Proponents of systems theory assert that interactions between individuals within specific contexts elicit behavioral and developmental differences. These individuals are interdependent because of their mutual influence, and thus create a bidirectional relationship (White & Klein, 2008). The bidirectional nature of mother-child relationships can perpetuate a cycle of negative interactions (Tronick & Reck, 2009). An example of this bidirectional relationship occurs when a depressed mother is less likely to smile at her infant. The infant is then less likely to make eye contact and smile at the mother. The mother may become frustrated with the infant’s lack of response, so she continues to display a negative affect toward her infant.

**The Effects on Children's Social & Emotional Development**

Maternal depressive symptoms negatively affect the well-being of young children (Weinfield, 2009). When the problematic innate characteristics of one’s personality, known as difficult temperament, and parenting factors, such as maternal mental health problems, are present, there is an increased risk for emotional problems in children (Cote, 2009). Difficult
temperament significantly predicts higher levels of internalizing problems (Cote, 2009). Additionally, while children’s difficult temperament is the most important predictor of later depression, lifetime maternal depression is the second most important predictor of depression and anxiety symptoms in children (Cote, 2009). When mothers demonstrate low levels of sensitivity, 12 month olds show high levels of negative emotionality (Pauli-Pott, 2004). Mothers who demonstrate fewer reactions to their infants and lower levels of sensitivity have children who experience more negative emotion and frustration (Pauli-Pott, 2004). Maternal sensitivity also has a negative impact on early emotionality and fear (Pauli-Pott, 2004).

Maternal sensitivity is important in the developing social competencies of infants (Feldman, 2009). Conversely, anxiety and depression of the mother have a negative effect on social engagement. Maternal sensitivity eases the potential negative effect of maternal depression for infants’ social development through fostering positive interactions (Feldman, 2009). As supported by these results, controlling depressive symptoms and increasing maternal sensitivity during interactions with children is imperative.

Children whose mothers are chronically depressed have the lowest levels of social competence and the highest levels of externalizing behaviors (Ashman, 2008). Externalizing behaviors, negative behaviors that are demonstrated in the outward actions of children on the external environment, may include disruption, hyperactivity, and aggression. Additionally, internalizing behaviors, problems that affect the child’s internal psychology, may be exhibited through withdrawal, anxiety, inhibition, and depressive symptoms (Liu, 2004). Children’s externalizing and internalizing behaviors are associated with maternal mental health (Hall, 2008; Weinfield, 2009; Ashman, 2008; Hoffman, 2006). Maternal
Depressive symptoms have the second largest effect on externalizing and internalizing behaviors (Hall, 2008). Externalizing behavior by toddlers is significantly predicted by maternal depression (Weinfield, 2009). Children whose mothers are chronically depressed have the lowest levels of social competence and the highest levels of externalizing behaviors (Ashman, 2008). Young children whose mothers exhibit significant depressive symptoms also demonstrate more problem behaviors, as reported by both mothers and fathers (Hoffman, 2006). The fact that this was reported by mothers and fathers is significant because the fathers offset the depressive bias of the mothers.

These depressive symptoms and problem behaviors also have a genetic component. Genetics can have a significant effect on maternal depression and children’s externalizing and internalizing behaviors. It is probable that these behaviors are the result of a combination of genetic predisposition to depressive symptoms, in addition to the interaction between the depressed mother and child (Kendler, 1995). While the consideration of genetics is important, scholars must also consider the role of cognitive readiness to parent.

**Cognitive Readiness to Parent**

Prenatal cognitive readiness to parent affects parenting skills and styles. Cognitive readiness to parent refers to how prepared an individual is to parent in terms of appropriate knowledge, expectations, and behaviors toward child development (O’Callaghan, 1999). Cognitive readiness to parent considers prenatal cognitions about parenting attitudes, parenting knowledge, and appropriate parenting strategies, as well as knowledge of child development (Miller, 1996). Adolescent parents are one sample population particularly at risk for low levels of cognitive readiness to parent. Cognitive readiness to parent serves as
an important predictor for personal adjustment and adolescent parenting. Adolescent mothers who have internalizing or externalizing issues are more likely to be focused on meeting their own needs instead of the needs of their children (O’Callaghan, 1999). Sommer (1993) found that adolescent mothers are less cognitively ready for parenting than adult mothers and that these adolescent mothers experience more stress related to parenting. These findings demonstrate why adolescent mothers are less responsive to their children.

These findings are important in considering adolescent parenting behaviors, but research also needs to consider the effects of cognitive readiness to parent in adults in order to have a more comprehensive understanding of cognitive readiness to parent across the lifespan. Research has examined cognitive readiness to parent as it relates to parenting outcomes (Chang, 2004); however, less research has been conducted investigating the relationships between cognitive readiness and child outcomes.

A study by Sektnan (2010) found that ethnicity, maternal education, and maternal depressive symptoms indirectly affect behavioral regulation in children through decreased access to resources which promote behavioral regulation and also through decreased levels of emotional availability to encourage interactions that foster behavioral regulation. One factor that leads to lower levels of cognitive readiness to parent is decreased levels of maternal education (Sommer, 1993). However, it is important to consider that personal characteristics that result in lower educational attainment also result in lower levels of cognitive readiness to parent. The relationship between education and cognitive readiness to parent could be partially spurious because the two concepts are so closely related. Lower education levels result in lower cognitive readiness to parent levels (Sommer, 1993).
One example population that is more at risk for low levels of cognitive readiness to parent is adolescents. Decreased levels of cognitive readiness to parent are associated with higher levels of internalizing and externalizing behaviors in children with adolescent mothers (Miller, 1996). Additionally, low levels of cognitive readiness to parent are associated with children showing lower skills in self-initiated coping behaviors (Miller, 1996). Self-regulation is vital within social and behavioral contexts; children lacking self-regulation often demonstrate inappropriate externalizing behaviors, such as aggression (Miller, 1996).

Researchers have shown that prenatal cognitive readiness to parent affects postnatal perceptions of child development (Miller, 1996). Children whose parents have positive perceptions of their child’s development are more likely to have better language development than those whose parents have negative perceptions of their child’s development. Miller (1996) also found that positive parenting practices and perceptions were associated with higher scores the Brigance Infant and Toddler Screens (Glascoe, 2002), which assesses social emotional outcomes as a domain subcategory. Additionally, negative perceptions of child development are associated with scores that are lower than average on the screenings. These effects are seen as early as six months of age (Glascoe, 2010). One possible weakness of this study is that parenting perceptions may actually be accurate reactions to the developmental outcomes of children.

Though parenting perceptions may be accurate reactions to child development, another study showed that parental perceptions of infants precede those specific emotional development characteristics (Pauli-Pott, 2003). This demonstrates the impact that parental perceptions have on children’s social and emotional development. The importance of this
finding, along with the results from the Glascoe study, is that parental perception affects infant behavior. More research should be done to understand parental cognitions in order to support mothers and their children’s development.

Regardless of whether social emotional development precedes or follows parental perceptions, studies have shown stability in social emotional outcomes over time. Research by Blandon (2010) demonstrates that externalizing behavior problems, as well as social skills, are unlikely to change over time. One method of reducing problematic externalizing behaviors has been classroom treatments of young children (Barkley, 2000). Though classroom interventions were proven effective, parent training was not successful in the reduction of disruptive behavior. Lack of parental attendance is the most probable cause for the failure of behavior improvement (Barkley, 2000). These findings again reinforce the importance for a holistic, systems approach to intervention in order to provide consistency and effectiveness for children.

The stability of externalizing behaviors and social skills over time implies that early social emotional development is predictive of later social emotional problems and also of later peer acceptance (Blandon, 2010). This supports the idea that early social emotional development has a significant impact throughout the lifetime. Thus, it is vital for interventions to occur early in life in order to produce maximum benefits. Intervention ought to be started as soon as a problem is detected. If untreated, the behavior problems may become more severe (Stormont, 2002). Therefore, attention has been focused on the earliest possible identification, prevention, and resolution of challenging behaviors (Powell, 2006). Additionally, Blandon (2010) revealed that better emotional regulation is associated with
lower levels of externalizing behaviors, highlighting the importance of fostering positive emotional development.

Because research has demonstrated that 60% of primiparous mothers experience depression (Lanzi, 2009) and that maternal depressive symptoms have the second largest effect on internalizing and externalizing behaviors (Hall, 2008), it is vital that more research be conducted to gain a better understanding of the specific risk and protective factors that are associated with the effects of maternal depression on children’s social emotional development. The current study will examine the possible mediating role of maternal depression on cognitive readiness to parent and children’s social emotional outcomes. Specifically, this study will attempt to answer the following questions:

1. Are prenatal maternal depression and cognitive readiness scores related to children’s social emotional development at 24 months?
2. Does maternal depression mediate the relationship between maternal cognitive readiness to parent and children’s social emotional outcomes at 24 months?
Chapter 3. Methods

Participants

Data were taken from the *Parenting for the First Time Project*, which is a longitudinal study designed to examine sub-threshold levels of neglectful parenting in first-time mothers. Participating mothers were recruited during pregnancy from primary care facilities in four cities (Birmingham, Alabama; South Bend, Indiana; Washington DC; and Kansas City, KS). The three groups of mothers included: adolescent (less than 19 years of age at baby’s birth, \( N=396 \)), lower-education adults (older than 21 years of age with less than two years of college, \( N=169 \)), and higher-education adults (older than 21 years of age with two or more years of college, \( N=117 \); Lanzi, 2009). The high proportion of adolescent and lower-education adult mothers will benefit the study by providing more variation in terms of levels of depression and cognitive readiness to parent.

Table 3 gives a description of demographic characteristics of the participants. Maternal age ranged from 15 to 35 years at the time of baby’s birth, with an average age of 19.8 years. The mean age of adolescent mothers was 17.5 years; the mean age of lower-education adult mothers was 25.5 years; and the mean age of higher-education adult mothers was 27.9 years. The sample consisted of 64.5% African American, 18.8% European American, 15.2% Hispanic/Latina, and 1.5% other ethnicities. Over half of the infants (53.5%) were female (Lanzi, 2009).
Table 1

*Demographic Characteristics*

<table>
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<th>Variable</th>
<th>N</th>
<th>%</th>
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<td>.9</td>
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<td>.7</td>
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<tr>
<td>Hispanic Multiracial</td>
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<td><strong>Total</strong></td>
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<tr>
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<td><strong>Total</strong></td>
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<td><strong>Participant Group</strong></td>
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<td>Adult, Low-Educ.</td>
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<td>Adult, High-Educ.</td>
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<td><strong>Total</strong></td>
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<td>100.0</td>
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<tr>
<td><strong>Age</strong></td>
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<tr>
<td>15-21</td>
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<td>22-27</td>
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<td>28-35</td>
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<tr>
<td><strong>Total</strong></td>
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</table>
Procedure

Interviews with mothers occurred during the third trimester of pregnancy and again at 24 months. Initial assessments were conducted via in-home interviews; consequent data was collected via in-person interviews and child assessments. Home visits lasted approximately 1.5 hours. Interviews and child assessments were conducted by research assistants trained to criterion and specifically trained in how to respond to mothers who might have clinical depression and/or suicidal thoughts.

Measures

**Prenatal Demographic Information.** Prenatal demographic information was collected via maternal self-reports including: highest grade completed, number of children living in home, number of adults living in home, current employment status, and ethnicity.

**Maternal Depression.** To assess maternal depression scores, the Beck Depression Inventory (BDI; Beck, 1961) was used. The BDI is a 21-item, self-report questionnaire measuring depressive symptoms. A score ranging from zero and three is given to indicate the level of severity for the 21 categories, including: (1) sadness, (2) future pessimism, (3) feeling like a failure, and more. Higher scores are indicative of more severe depressive symptoms. The internal consistency is high for the BDI (Cronbach’s alpha ≥ 0.9) (Uher, 2008).

**Cognitive Readiness to Parent.** Cognitive readiness to parent was measured using the Parenting Styles interview and the Knowledge of Infant Development Inventory. The Parenting Styles interview was adapted from the Adult-Adolescent Parenting Inventory I
(Bavolek, 1984; O’Callaghan, 1999; Sommer, 1993, 2000). It assessed maternal knowledge and parenting practices. Mothers used a 5-point scale to demonstrate extent of agreement or disagreement with 27 statements, such as, “Children will quit crying faster if you ignore them” and “Parents should slap children when they do something wrong”. Optimal parenting is indicated by higher scores. The internal consistency of this measure is .89; the 6 month test-retest reliability is .87 (Whitman, 2001).

Parent’s knowledge of infant development was measured by a briefed version of the Knowledge of Infant Development Inventory (KIDI; MacPhee, 1981). Knowledge of infant development was assessed using a 5-point scale to rate 14 factual items, such as “A one-year-old knows right from wrong” and “A baby usually says his/her first real word by 6 months of age”. Responses ranged from strongly agree to strongly disagree. Higher scores indicate higher levels of child development knowledge. The full KIDI has a test-retest reliability of .92; the shortened version has an internal consistency of .58 (Lefever, 2008).

**Children’s Social Emotional Outcomes.** To assess social emotional development of children in the sample, the Infant-Toddler Social and Emotional Assessment (ITSEA) was used (Carter & Briggs-Gowan, 2006). Specifically, the externalizing and internalizing domain total scores were used for assessment. The ITSEA is an adult-reported measure of children, ages one to three years, in regard to their social emotional troubles and competencies. This measure assesses externalizing and internalizing behaviors (Carter & Briggs-Gowan, 2006). Externalizing behaviors are negative behaviors demonstrated through outward actions of children toward the external environment. Examples of externalizing behaviors are disruption, hyperactivity, and aggression. Internalizing behaviors refer to
issues which affect the child’s internal psychology. Examples of internalizing behaviors include withdrawal, anxiety, inhibition, and depressive symptoms (Liu, 2004).

There are 139 items that make up the main components of the ITSEA. The complete ITSEA includes 166 items. Each item is rated on a three-point scale: (0) not true/rarely, (1) somewhat true/sometimes, and (2) very true/often. There is also an option that signifies there has not been the opportunity to observe specific behaviors. High scores on externalizing and internalizing domains are indicative of problem behaviors. The ITSEA determines externalizing and internalizing behaviors as problem behaviors by comparing domain scores to standard cutoff scores for gender and age subgroups. The domain score, which is a mean raw score, is problematic if it falls in at or below the 10th percentile for the norm group. Domain scores are also converted into T-scores; scores that are 1.5 or more standard deviations above average are areas of concern. Children whose scores fall into the range of concern are at risk for delayed, deficient, or deviant behaviors relating to their ability to regulate behaviors and emotions in comparison with peers of the same age and sex (Carter & Briggs-Gowan, 2008). The average Cronbach’s alpha for internal consistency is acceptable at 0.69 (Carter, 2002).

**Analyses**

Analyses were conducted using the SPSS statistical analysis program. An alpha level of .05 was used for all analyses.

Are prenatal maternal depression and cognitive readiness to parent scores related to children’s social emotional development at 24 months? A correlation determined the significance of these relationships.
Does maternal depression mediate the relationship between cognitive readiness to parent scores and children’s social emotional outcomes at 24 months? One way analyses of variance were conducted to determine if adolescent, low-education, and high-education mothers differed on each variable. Post-hoc comparisons and the Tukey test were also conducted to convey the significant differences between the three subgroups of mothers. The one way analyses of variance also analyzed the percent of variance accounted for by the predictor variables. Regression analyses were conducted to determine if maternal depression mediates the relationship between maternal cognitive readiness to parent and children’s social emotional development.
Chapter 4. Results

Testing of Hypotheses and Description of Results

Tables 2 and 3 show the descriptive statistics for each variable in the subsequent analyses. In order to answer the first research question, correlations were run between the two cognitive readiness to parent variables, maternal depression, and children’s externalizing and internalizing scores (See Tables 2 and 3). A one way analysis of variance was conducted to determine if adolescent, low-education, and high-education mothers differed on parenting style, knowledge of infant development, depression, children’s externalizing outcomes, and children’s internalizing outcomes. This test was used to determine if the three subgroups of mothers exhibited significantly different scores, which then allowed the relationships between the variables to be determined. Mothers did significantly differ on parenting style (F= 32.159, p=.000), knowledge of infant development (F= 73.015, p=.000), depression (F= 5.616, p=.004), and children’s externalizing outcomes (F= 14.133, p=.000). However, mothers did not significantly differ on children’s internalizing outcomes (F= 2.528, p=.081).

The Tukey test revealed that adolescent mothers had a mean difference of 1.906 points higher than adult, low-education mothers on depression scores (p=.024). Adolescent mothers also had a mean difference of 2.212 points higher than adult, high-education mothers on depression scores (p=.021). However, the mean difference between adult, low-education and adult, high-education was not significant on depression scores (p=.945).

The Tukey test also revealed the three groups of mothers significantly differed on knowledge of infant development. Adolescent mothers had mean scores that were 1.418
points lower than adult, low-education mothers (p= .024) and 7.478 points lower than adult, high-education mothers (p= .000). Adult, low-education mothers had mean differences that were 6.060 points lower than adult, high-education mothers (p= .000). For parenting styles, adolescent mothers had mean scores that were 3.239 points lower than adult, low-education mothers (p= .028) and 11.551 points lower than adult, high-education mothers (p= .000). Adult, low-education mothers had mean scores that were 8.312 points lower than adult, high-education mothers (p= .000).

The Tukey test revealed that mean scores of adolescent mothers did not significantly differ from the mean scores of adult, low-education mothers (p= .951) on children’s externalizing outcomes. However, adolescent mothers did significantly differ from adult, high-education mothers (p= .000). Adult, low-education mothers also had significantly different mean scores from adult, high-education mothers. Adult, low-education mothers had scores that were .191 points higher than adult, high-education mothers (p= .000). Children’s mean internalizing scores did not differ significantly between adolescent mothers; adult, low-education mothers (p= .702); or adult, high-education mothers (p= .066). Adult, low-education mothers also did not significantly differ from adult, high-education mothers (p= .400).

The second research question that was analyzed was if prenatal maternal depression and cognitive readiness to parent scores related to children’s social emotional development at 24 months. The parenting style measurement of cognitive readiness to parent of mothers was negatively related to maternal depression scores; however, the correlation for the knowledge of infant development score was not significant. More positive parenting style scores were
related to lower depression scores. Maternal cognitive readiness to parent was related to children’s externalizing and internalizing scores. As cognitive readiness to parent increased, children’s externalizing and internalizing behavior scores decreased. Additionally, increased levels of maternal depression were related to increased levels of externalizing and internalizing behaviors. Higher scores on depression were related to higher levels of externalizing and internalizing scores.

Does maternal depression mediate the relationship between cognitive readiness to parent scores and children’s social emotional outcomes at 24 months? The total variance accounted for by parenting styles ($R^2$) and the change in variance accounted for by parenting styles and depression ($\Delta R^2$) were computed through one way analyses of variance (ANOVA). The total variance accounted for by knowledge of infant development ($R^2$) and the change in variance accounted for by knowledge of infant development and depression ($\Delta R^2$) were computed through one way analyses of variance.

Table 4 shows the results from the parenting styles and externalizing outcomes ANOVA model. Parenting style accounts for 6.7% of the explained variance in children’s social emotional externalizing scores (p=.000). Maternal depression added significant account of 3.6% of the explained variance (p=.000). The full model with both parenting styles and depression was statistically significant and accounted for 10.3% of the explained variance in externalizing scores (p=.000; See Table 4). Table 5 shows the results from the knowledge of infant development and externalizing outcomes ANOVA model. Knowledge of infant development accounts for 5.0% of the explained variance in children’s social emotional externalizing scores (p=.000). Maternal depression added significant account of
5.7% of the explained variance (p = .000). The full model with both knowledge of infant
development and depression was statistically significant and accounted for 10.7% of the
explained variance in externalizing scores (p = .000; See Table 5).

Table 6 shows the results from the parenting styles and internalizing outcomes
ANOVA model. Parenting style accounts for 5.3% of the explained variance in children’s
social emotional internalizing scores (p = .000). Maternal depression did not add a
significant amount of explained variance (.7%, p = .076). The full model with both parenting
styles and depression was statistically significant (p = .000; See Table 6). Table 7 shows the
results from the knowledge of infant development and internalizing outcomes ANOVA
model. Knowledge of infant development accounts for 3.6% of the explained variance in
children’s social emotional internalizing scores (p = .000). Maternal depression added
significant account of 1.9% of the explained variance (p = .005). The full model with both
knowledge of infant development and depression was statistically significant and accounted
for 5.5% of the explained variance in internalizing scores (p = .000 See Table 7). The percent
of explained variance accounted for among both externalizing and internalizing models is
similar to other findings of studies with similar constructs (Lanzi, 2009).

A test of mediation was conducted to determine if maternal depression mediated the
relationships between cognitive readiness to parent measures and children’s externalizing and
internalizing behaviors (See Figures 2 through 5). Parenting style scores and knowledge of
infant development scores were analyzed separately for both externalizing and internalizing
outcomes because there was no cohesive measure of the cognitive readiness to parent
indicators. First, the parenting style score was entered as the independent variable and the
The total externalizing score was entered as the dependent variable (path c). Second, the parenting style score was entered as independent variables and the total depression score was entered as the dependent variable (path a). Finally, the parenting style score and total depression scores were entered as independent variables and the total externalizing score from the ITSEA was entered as the dependent variable (c’). The standardized beta coefficients were examined to determine mediation.

First, the knowledge of infant development score was entered as the independent variable and the total externalizing score was entered as the dependent variable (path c). Second, the knowledge of infant development score was entered as independent variables and the total depression score was entered as the dependent variable (path a). Finally, the knowledge of infant development score and total depression scores were entered as independent variables and the total externalizing score from the ITSEA was entered as the dependent variable (c’). The standardized beta coefficients were examined to determine mediation. The same analyses were conducted for internalizing behaviors with parenting style scores and knowledge of infant development scores.

In order for a variable to be considered a mediator, (a) the variations in the different levels of predictor variables must significantly account for variations in the predicted mediator, (b) variations in the predicted mediator must significantly account for variations in the outcome variable, and (c) when the first two paths are controlled, a previously significant relationship between the predictor and outcome variables must no longer be significant (Baron and Kenny, 1986). Depression did not fully mediate the relationship between cognitive readiness to parent and children’s externalizing or internalizing behaviors.
Variations in cognitive readiness to parent, as measured by parenting style and knowledge of infant development scores, did significantly account for variations in externalizing behaviors (See Figure 2 and 3). Variations in depression scores did significantly account for variations in externalizing behaviors. However, the relationship between cognitive readiness to parent and externalizing behaviors remained significant after controlling for the first two paths.

A Sobel test was conducted to assess partial mediation (Sobel, 1990). The test statistic for the mediating effects of depression on the relationship between parenting style and externalizing behaviors equaled -3.530 with a standard error of .000 and a p-value of .000. The test statistic for the mediating effects of depression on the relationship between knowledge of infant development scores and externalizing behaviors equaled 4.817 with a standard error of .002 and a p-value of .000. This indicates that the relationship between cognitive readiness to parent and externalizing behaviors of children is partially mediated by maternal depression.

Variations in cognitive readiness to parent, as measured by parenting style and knowledge of infant development scores, did significantly account for variations in internalizing behaviors also (See Figures 4 and 5). Variations in depression scores did significantly account for variations in internalizing behaviors. However, the relationship between parenting styles and internalizing behaviors remained significant after controlling for the first two paths, while the relationship between knowledge of infant development scores and internalizing behaviors became insignificant.
A Sobel test was conducted to assess partial mediation (Sobel, 1990). The test statistic for the mediating effects of depression on the relationship between parenting style and internalizing behaviors equaled -1.450 with a standard error of .000 and a p-value of .147. The test statistic for the mediating effects of depression on the relationship between knowledge of infant development scores and internalizing behaviors equaled 1.237 with a standard error of .000 and a p-value of .216. This indicates that the relationship between cognitive readiness to parent and internalizing behaviors of children is not even partially mediated by maternal depression.

### Tables

#### Table 2

*Externalizing Social Emotional Outcomes, Cognitive Readiness, and Depression Variables: Correlations and Descriptive Statistics*

(N=397)

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<thead>
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*P-values are in parentheses*
**Table 3**

*Internalizing Social Emotional Outcomes, Cognitive Readiness, and Depression Variables: Correlations and Descriptive Statistics*

(N=394)

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<td>-.267(.000)</td>
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</tr>
<tr>
<td>4. Depression Total</td>
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*P*-values are in parentheses

**Table 4**

*Analysis of Variance Test to Examine Parenting Styles, Depression, and Externalizing Behaviors*

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*P*-values are in parentheses
Table 5

Analysis of Variance Test to Examine Knowledge of Infant Development, Depression, and Externalizing Behaviors

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<td>Depression</td>
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*P-values are in parentheses

Table 6

Analysis of Variance Test to Examine Parenting Styles, Depression, and Internalizing Behaviors

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<th>Statistic</th>
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Table 7
Analysis of Variance Test to Examine Knowledge of Infant Development, Depression, Internalizing Behaviors

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<td>R²</td>
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*P*-values are in parentheses

Figures

Figure 2
Depression as a Mediator of Parenting Style and Externalizing Behaviors

Model A

\[
\text{Parenting style} \rightarrow \text{Depression} \rightarrow \text{Externalizing}
\]

\[\beta = -.259, \ p = .000\]

Model B

\[
\begin{align*}
\text{Parenting style} & \rightarrow \text{Depression} \\
\beta &= -.207, \ p = .000 \\
\text{Depression} & \rightarrow \text{Externalizing} \\
\beta &= .198, \ p = .000 \\
\text{Parenting style} & \rightarrow \text{Externalizing} \\
\beta &= -.204, \ p = .000
\end{align*}
\]
Figure 3
Depression as a Mediator of Knowledge of Infant Development and Externalizing Behaviors

Model A
Knowledge of infant development → Externalizing
\[ \beta = -0.229, p = 0.000 \]

Model B
Knowledge of infant development → Depression → Externalizing
\[ \beta = -0.058, p = 0.140 \]
\[ \beta = 0.238, p = 0.000 \]

\[ \beta = -0.207, p = 0.000 \]

Figure 4
Depression as a Mediator of Parenting Style and Internalizing Behaviors

Model A
Parenting style → Internalizing
\[ \beta = -0.233, p = 0.000 \]

Model B
Parenting style → Depression → Internalizing
\[ \beta = -0.207, p = 0.000 \]
\[ \beta = 0.090, p = 0.076 \]

\[ \beta = -0.206, p = 0.000 \]
Figure 5
Depression as a Mediator of Knowledge of Infant Development and Internalizing Behaviors

Model A

Knowledge of infant development → Internalizing
\[ \beta = -0.188, \ p = 0.000 \]

Model B

Knowledge of infant development → Depression
\[ \beta = -0.058, \ p = 0.140 \]

Depression → Internalizing
\[ \beta = 0.139, \ p = 0.005 \]

Knowledge of infant development → Internalizing
\[ \beta = -0.179, \ p = 0.000 \]
Chapter 5. Discussion and Conclusions

**Interpretation of Results**

Maternal parenting style is significantly correlated with maternal depression; however, the relationship between knowledge of infant development and maternal depression did not show significant correlation. This finding is not surprising because depression is expected to influence parenting behavior (Lanzi, 2009) rather than developmental knowledge. Additionally, lower levels of maternal cognitive readiness to parent are associated with higher levels of externalizing and internalizing outcomes for children; whereas higher levels of maternal depression resulted in higher levels of externalizing and internalizing behaviors in children. These results are consistent with findings from previous literature. Low levels of cognitive readiness to parent have been associated with high levels of externalizing and internalizing behaviors (Miller, 1996). Higher levels of maternal depression have often been correlated with more externalizing and internalizing problem behaviors (Hall, 2008; Weinfield, 2009; Ashman, 2008, Hoffman, 2006).

Adolescent mothers had higher levels of depressive symptoms than adult, low-education mothers and adult, high-education mothers. However, the average level of depression did not differ between adult, low-education and adult, high-education mothers. Additionally, adolescent mothers scored lower than adult, low-education mothers and adult, high-education mothers on knowledge of infant development and parenting styles. Adult, low-education mothers also scored significantly lower than adult, high-education mothers.
Adolescent mothers did not differ significantly from adult, low-education mothers in terms of children’s externalizing scores; however, adolescent mothers and adult, low-education mothers both had significantly different mean scores from adult, high-education mothers. Children with adolescent mothers or adult, low-education mothers demonstrated higher levels of externalizing behaviors. In contrast, the mean scores of children with adolescent; adult, low-education, or adult, high-education mothers did not differ significantly. Because the scores of the dependent variables did not differ among the three groups of mothers, barring the adult, high-education mothers, the research questions in this study analyzed the whole sample rather than using subgroups for mothers. However, researchers should investigate the differences between the subgroups of mothers in regards to children’s externalizing behavior in the future.

Prenatal cognitive readiness to parent does explain part of children’s externalizing and internalizing behavior at 24 months. Prenatal maternal depression added more explanation to the externalizing model than the internalizing model; however, significant additions were seen in both models. These findings are important for practitioners to note.

Depression and cognitive readiness to parent both influence child outcomes; therefore, it will be most effective to consider a more holistic approach to working with depressed mothers. Holistic strategies are also supported by the systems theoretical approach, wherein all parts of the family are interconnected (White & Klein, 2008). Intervention programs ought to emphasize the importance of successful coping strategies regarding depression, as well as useful techniques to increase cognitive readiness to parent.
Depression partially mediated the relationship between cognitive readiness to parent and children’s externalizing outcomes. Interestingly, maternal depression did not partially mediate the relationship between cognitive readiness to parent and children’s internalizing behaviors. These findings demonstrate a need for further investigation to explore possible explanations.

Weinfield (2009) also found maternal depression to more significantly predict and explain externalizing than internalizing behaviors in children, though no explanation for this finding is offered. The internal consistency alpha for internalizing behaviors is lower than the internal consistency alpha for externalizing behaviors in the Weinfield (2009) study, indicating that it may be more difficult to accurately measure internalizing behaviors of young children than externalizing behaviors. Carter (2002) also reports a lower internal consistency for internalizing compared to externalizing scores regarding the ITSEA. These inconsistencies may also affect the present study through the same methodological issues.

One possible cause for this reliability difference is the difficulty in measuring internalizing behaviors of a young child. Internalizing behaviors are much more difficult to identify in young children. Because internalizing behaviors are more challenging to observe at this age, parents and professionals may not be aware of these issues (Lane, 2003). Internalization may be exhibited through physical manifestations of pain, such as headaches (Shannon, 2010).

Prenatal variables, such as maternal depression and cognitive readiness to parent, are important because of the effects they have on children’s social emotional outcomes. Depressed mothers exhibit immature emotional regulation to their infants, thereby restricting
the emotional regulatory ability of the infant through scaffolding (Feldman, 2009; Tronick & Reck, 2009; Burnier, 2010). Hoffman (2006) suggests that skills surrounding emotional regulation are stable over time. However, toddlerhood is still a moldable age and social emotional skills can be taught. In addition to the importance of maternal depression’s effect on children’s social emotional development, cognitive readiness to parent also plays a vital role in affecting parenting skills and styles (O’Callaghan, 1999). Lower levels of cognitive readiness to parent are related to higher levels of externalizing and internalizing behaviors (Miller, 1996).

These literature findings combined with the supporting results from the current study demonstrate the importance of further investigation of the dynamic relationships between maternal depression, cognitive readiness to parent, and children’s social emotional outcomes. A more in depth understanding of how these variables interact will provide a more comprehensive guide to professionals working with these families. The systemic approach to providing effective therapeutic techniques to depressed mothers and their children will be enhanced through further research regarding the interplay of maternal depression, cognitive readiness to parent, and children’s social emotional outcomes.

**Limitations and Future Research**

There are several limitations to this research study. Firstly, the measures were assessed through mother-reports. Especially in the group of mothers who exhibit more depressive symptoms, these ratings may experience reporter bias due to mental health issues. This bias may cause skewed results. Another limitation is that the sample itself is skewed. Due to the nature of the primary research goals, the study recruited a higher proportion of
adolescent mothers than adult mothers. This may cause the results to be less generalizable to
the general population of primiparous mothers. The lack of genetic component is also a
weakness of the study. Research has shown that depression is genetically passed on to
offspring (Kendler, 1995).

Measuring social emotional outcomes at 24 months may be another limitation to the
study. It is difficult to assess the internalizing behaviors of a toddler (Weinfield, 2009).
Additionally, a fairly low internal consistency alpha of .69 is reported for the Brief ITSEA
that is used in this study (Carter, 2002). This low alpha may result in inaccurate
representation of social emotional outcomes at 24 months.

There is still considerable need for research concerning depression, cognitive
readiness to parent, and children’s social emotional outcomes. More research should be
conducted to highlight the mediating pathways of cognitive readiness to parent and maternal
depression. These variables are vital to the direction of future intervention strategies for
professionals working with depressed mothers. More research will need to be conducted to
examine the relationship of depression’s effects on cognitive readiness to parent and
externalizing behaviors. Further understanding of this area will allow professionals to create
more effective techniques for helping depressed mothers and their children.

Future research should also investigate the how each of these variables interact with
one another. It would be interesting to see results of analyses that place depression as the
dependent variable, social emotional outcomes as the independent variable, and cognitive
readiness to parent as the mediating variable. These types of investigative analyses would
allow researchers to understand how the variables specifically are interacting. Further
understanding will allow professionals to deliver services that are more specifically useful. This area of research would provide evidence for effective intervention approaches and be effective for professionals to use in the creation of new programs that focus on increasing cognitive readiness to parent and controlling depressive symptoms. It is important for practitioners to understand the relationship between depression, cognitive readiness to parent, and children’s social emotional outcomes. A deeper understanding of these interactions will foster recognition of the effects of controlling depressive symptoms and increasing cognitive readiness to parent.

Though research has demonstrated the importance of a systems approach to intervention, the specific interactions between depression, cognitive readiness to parent, and social emotional outcomes need to be investigated further. As research continues to expand on maternal depression, cognitive readiness to parent, and children’s social emotional outcomes, practitioners will have increased resources to create and implement effective strategies for working with these families. Effective intervention techniques will result in positive changes in family interactions and positive developmental trajectories for individual family members.
Appendix

Institutional Review Board Approval Form

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Date: 11/15/2010

To: Lyndsay Tystani
134 Oriole St
Ames, IA 50010

From: Office for Responsible Research

Title: Effects of Maternal Depression and Education on Children's Social/Emotional Development

The Co-Chair of the ISU Institutional Review Board (IRB) has reviewed the project noted above and determined that the project:

☐ Does not meet the definition of research according to federal regulations.
☒ Is research that does not involve human subjects according to federal regulations.

Accordingly, this project does not need IRB approval and you may proceed at any time. We do, however, urge you to protect the rights of your participants in the same ways you would if IRB approval were required. For example, best practices include informing participants that involvement in the project is voluntary and maintaining confidentiality as appropriate.

Please also know that any change to this project must be communicated to the IRB to determine if the project has become research with human subjects requiring IRB approval.
References


