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Adult and adolescent parenting: Differences in maternal knowledge of infant development and parenting style.

Leslie J. Keener
University of Alabama at Birmingham

ADULT AND ADOLESCENT PARENTING: DIFFERENCES IN MATERNAL KNOWLEDGE OF INFANT DEVELOPMENT AND PARENTING STYLE

by

LESLIE J. KEENER

KRISTI C. GUEST, COMMITTEE CHAIR
KARLENE K. BALL
FRED J. BIASINI
BEVERLY A. MULVIHILL
DAVID E. VANCE

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LESLIE J. KEENER

LIFESPAN DEVELOPMENTAL PSYCHOLOGY

ABSTRACT

Cognitive readiness to parent has been examined within the context of the model of adolescent parenting in which this construct was introduced. Cognitive readiness has been shown to influence parenting stress and child outcomes. However, little research has been conducted on relationships among the variables that compose this construct. The current study addresses this gap in the literature by examining the relationship between two of these variables, knowledge of development and parenting style, in a longitudinal study. Adolescent mothers, low-resource adult mothers, and high-resource adult mothers were interviewed during the prenatal period and six months postpartum. At these time points, demographic information was collected, as well.

Adolescent, low-resource, and high-resource adult mothers were tested for differences on both outcome and demographic variables. Significant differences were found in prenatal parenting style and six months postpartum parenting style among all groups; therefore, subsequent analyses examined each group individually. Differences were also found in race, marital status, education levels, and IQ scores. Each of these demographic variables was controlled for in subsequent analyses.

Study hypotheses were examined through a series of hierarchical regressions. For all groups, prenatal knowledge of development predicted prenatal parenting style, and six month postpartum knowledge of development predicted parenting styles endorsed at six months postpartum. Prenatal knowledge of development predicted six month postpartum

knowledge of development, and prenatal parenting style predicted six month postpartum parenting style. For adult groups only, prenatal knowledge of development predicted six month postpartum parenting style.

In summary, the present study has contributed valuable information concerning two of the variables that compose the cognitive readiness to parent construct by providing preliminary evidence that knowledge of development is predictive of parenting style. Differences were found among adolescent, low-resource adult, and high-resource adult mothers that should be taken into account in future studies. Furthermore, the relationships identified within the construct of cognitive readiness to parent have the potential to explain how the variables that compose this construct operate to influence parenting stress and child outcomes.

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INTRODUCTION

In recent years the U.S. teen birth rate has continued to decline, down to 41.2 births per 1,000 women ages 15 to 19 in 2004 (National Center for Health Statistics, 2005). However, the United States still has the highest adolescent birth rate of any industrialized nation (National Center for Health Statistics, 2001). It has been suggested that it is not the rate of teen births alone that has led to the destructive impact on these young mothers and their children. In contrast to past decades, most adolescent mothers now choose to rear their children themselves despite their limited resources and status as single mothers (Vinovskis, 1988). In doing so, they are often faced with difficult decisions regarding their own education. They may delay or even cut short their education, making it difficult for them to provide for themselves and their children (Vinovskis, 2003). The following discussion focuses on some of the consequences of adolescent pregnancy for these young mothers and their children. A model of adolescent parenting is examined briefly. One particular construct introduced in this model, cognitive readiness to parent, is examined in depth; in addition, relations among the variables that compose this construct are proposed.

In comparison with the general population and the children of adult mothers, children of adolescent mothers are at a greater risk of poor developmental outcomes, social and cognitive delays and developmental disabilities (American Academy of Pediatrics Committee on Adolescence, 2001; Coley & Chase-Lansdale, 1998;Whitman, Borkowski, Keogh & Weed, 2001). Developmental deficits often continue to be evident

into late childhood and adolescence. These children have been described as being temperamentally difficult, slow to adapt to new situations and routines, withdrawn, and as having an overall negative mood (Dukewich, Borkowski & Whitman, 1996). In general, the children of adolescent mothers have less optimal attachment classifications than lower risk populations do (Broussard, 1995; Spieker & Bensley, 1994; Ward & Carlson, 1995). In preschool, the children of adolescent mothers begin to show higher levels of behavior problems including increased aggression and lower impulse control, as well as delays in cognitive development. These behavior problems and cognitive delays carry over into the early school years (Coley & Chase-Lansdale, 1998; Hofferth & Reid, 2002; Sommer et al., 2000). By adolescence, these children have increased rates of grade failure, juvenile delinquency, incarceration, early sexual activity, and pregnancy than children born to older mothers (Coley & Chase-Lansdale, 1998).

Adolescent mothers frequently provide a lower quality, less stimulating home environment for their children than adult mothers do (Andreozzi, Flanagan, Seifer, Brunner & Lester, 2002; Coley & Chase-Lansdale, 1998). They smile, touch, speak to, and offer toys to their infants significantly less often than adult mothers. Adolescent mothers are also less sensitive to and accepting of their infant's behavior (American Academy of Pediatrics Committee on Adolescence, 2001; Barratt & Roach, 1995; Coley & Chase-Lansdale, 1998; Helm, Comfort, Bailey & Simeonsson, 1990), and are less responsive in their interactions with their infants than adult mothers (Passino et al, 1993). In one study, when their children were 12 months old, adolescent mothers continued to use fewer and less appropriate vocal interactions with their children than adult mothers

(Barratt & Roach, 1995). Finally, adolescent mothers tend to be authoritarian parents, displaying more punitive parenting styles (Whitman, et al., 2001).

The lower quality of parenting in adolescent mothers as compared to adult mothers suggests that the developmental deficits and behavioral problems of the children of teen mothers are due in part to the adolescent mothers' parenting skills and behaviors. Therefore, it is important to examine dimensions of parenting in this population to identify problem areas in which parenting interventions could improve the outcomes for children of adolescents.

In 1984, Belsky introduced a comprehensive model of parenting in which multiple characteristics of the mother and her environment interact to influence child development. According to this model, a mother's developmental history influences her personality, which in turn influences her parenting. Maternal personality also influences her marital relations, work, and social network, which then in turn affect parenting, as shown in Figure 1. Marital relations, work, and social network also have a reciprocal influence on personality. Meanwhile, parenting and child characteristics influence child development directly.

However, it has been argued that this model may not be ideal for examining adolescent parenting due to differences in social support networks, marital relationships, cognitive abilities, and the adolescent's off-time transition to parenthood (Nath, Borkowski, Whitman & Schellenbach, 1991; Whitman, Borkowski, Schellenbach & Nath, 1987). A modified model of teenage parenting and child development has been introduced that addresses the unique characteristics of the adolescent mother and is shown in Figure 2 (Schellenbach, Whitman & Borkowski, 1992; Whitman et al., 1987).

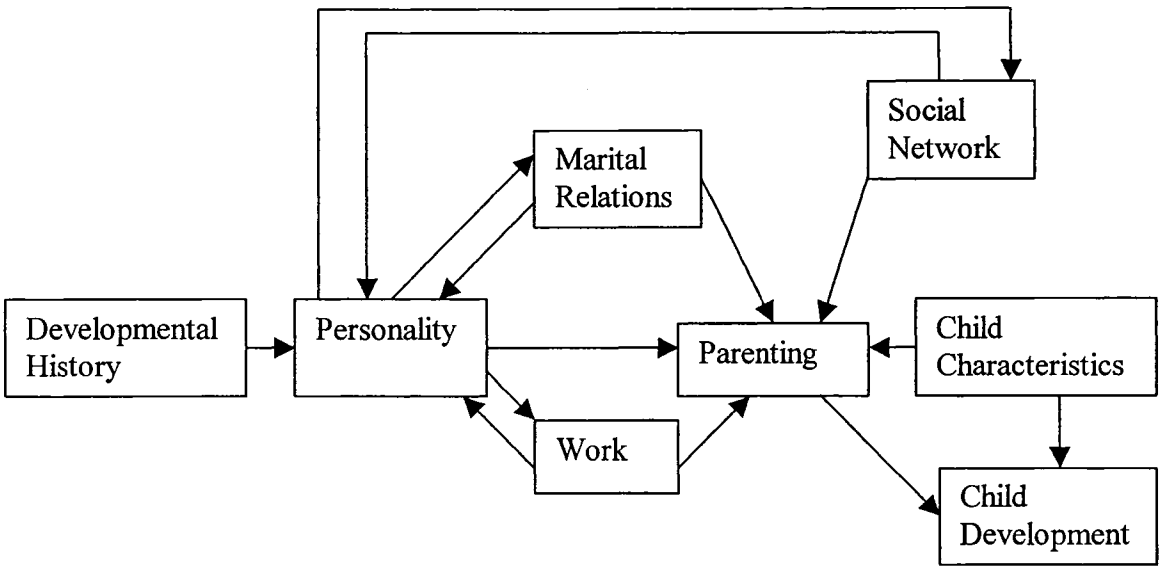

Figure 1: *Belsky's model of parenting*
Note: From "The Determinants of Parenting: A Process Model" by J. Belsky, 1984, *Child Development, 55(1),* p. 84. Copyright 1984 by Blackwell Publishing. Reprinted with permission.

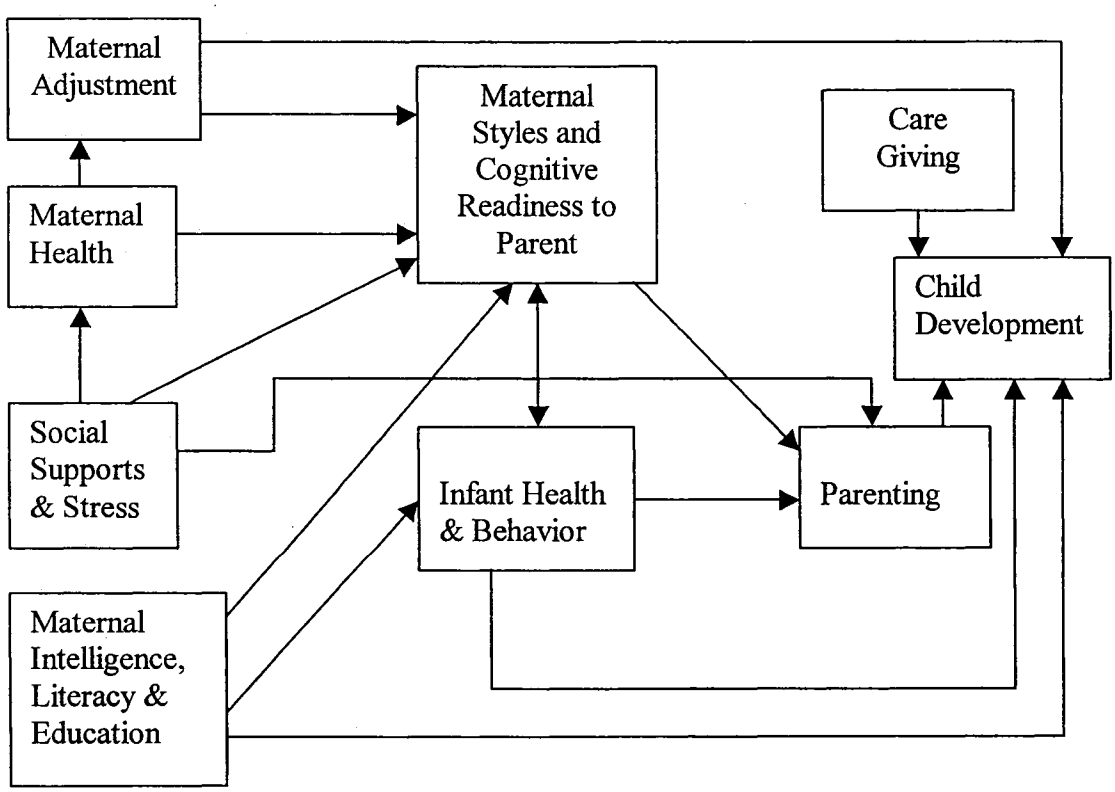

Figure 2: *A model of adolescent parenting*

In this modified model, psychosocial adjustment, health, social support, stresses, intelligence and education all interact and influence maternal cognitive readiness to parent. Cognitive readiness to parent, in turn, influences infant behavior and health, parenting behaviors, and caregiving received by the child. In contrast to Belsky's model, this adolescent model does not examine marital relations or work. The authors of the adolescent model indicate that the instability of adolescent relationships with their partners causes them to rely much more heavily on other sources of support. Work was also seen as inconsistent or nonexistent and thus was not included in the adolescent model.

One important difference between this newer model of adolescent parenting and Belsky's model of parenting is the addition of the cognitive readiness to parent construct. Cognitive readiness to parent is proposed to impact parenting behavior directly, as well as having indirect effects on child development through parenting behavior. Additionally, the model predicts that cognitive readiness to parent will be directly influenced by maternal cognitive ability and education. As the model was refined, cognitive readiness to parent was defined as knowledge of infant and child development, parenting style, and attitudes toward parenting (Schellenbach et al., 1992). Subsequently, each of these variables is discussed individually and the available research on cognitive readiness is reviewed.

Knowledge of Infant and Child Development

Mothers who are more educated, have greater financial resources, and are married have been shown to have more knowledge of the development of infants (Hess, Teti &

Hussey-Gardner, 2004; Vukelich & Kliman, 1985). Teenage mothers in particular, who tend to be less educated, less financially stable, and more likely to be unmarried than adult mothers have been shown to have inaccurate ideas about the appropriate ages at which developmental milestones occur (Reis, 1989; Whitman et al., 2001). However, the nature of these inaccuracies varies among studies. In some samples, adolescent mothers overestimated the ages at which cognitive, social, and language milestones occur. In other samples, adolescent mothers underestimated the ages at which these milestones take place (Elster, McAnarney & Lamb, 1983). Although adult mothers may also have inaccurate ideas about when developmental milestones occur, adolescent mothers' knowledge seems to be more limited than that of adult mothers (Reis, 1989; Vukelich & Kliman, 1985). Additionally, adolescent mothers do not appear to gain parenting knowledge through the experience of parenting, with second-time adolescent mothers scoring no higher than first-time adolescent mothers on developmental knowledge (Seymore, Frothingham, Macmillan & Durant, 1990).

Less knowledge of child development has been associated with lower quality in the home environment and in the interactions between mother and child, as well as with a greater number of child behavioral problems (Benasich & Brooks-Gunn, 1996). Greater parental knowledge of child development has been associated with higher levels of self-perceived competence in parenting (Bornstein et al., 2003). Higher levels of developmental knowledge have also been associated with more maternal responsiveness toward one's infant (Stevens, 1984). In contrast, mothers who underestimated their child's development were less sensitive with their infants during interactions (Huang, Caughy, Genevro & Miller, 2005). Additionally, mothers who have unrealistic

developmental expectations for their child tend to use more punitive and rejecting forms of discipline (American Academy of Pediatrics Committee on Adolescence, 2001). Furthermore, some studies have found a relation between knowledge of infant and child development and risk of child maltreatment. Less knowledge was associated with a higher risk of maltreatment (Azar & Rohrbeck, 1986; Britner & Reppucci, 1997).

Knowledge of child development also impacts parenting indirectly by serving to influence associations between parental self-efficacy and maternal parenting behaviors. Parental self-efficacy refers to how confident individuals feel in their ability to be a good parent. When mothers score high on knowledge of infant development, high levels of parental efficacy were associated with more competent parenting behaviors. In contrast, when scores are low on knowledge of infant development, mothers with high levels of parental self-efficacy appear to be less competent in their parenting behaviors than mothers with lower levels of parental self-efficacy (Hess et al., 2004).

Finally, Stoiber and Houghton (1993) found a significant interaction effect of knowledge of infant development and parenting beliefs toward authoritarian parenting. Authoritarian parenting refers to parenting behaviors that are very harsh, rigid, and controlling. Mothers who scored high on measures of child development knowledge and on measures of authoritarian beliefs had children who were rated as less capable of generating and directing actions to meet their own needs and to interact with others. In contrast, when mothers had less authoritarian beliefs, knowledge of child development did not seem to impact children's abilities to generate and direct these actions.

Parenting Style

Parenting style refers to the mother's awareness of what constitutes appropriate parenting practices, such as when and what punishments are appropriate for various ages and the mother's ability to identify and respond to her child's needs (Schellenbach et al., 1992; Sommer et al., 1993). However, the variation in terminology utilized in the literature makes the examination of this variable somewhat problematic. Researchers have employed several different terms to describe the same measure of parenting but have at other times used the same term to describe different aspects of parenting. For example, the Adult-Adolescent Parenting Inventory (AAPI) has been cited as a measure of "knowledge of parenting skills" (Hurlbut, Culp, Jambunathan & Butler, 1997) and "parenting and childrearing attitudes" (Marshall et al., 1994); however, the subscales of this measure, individually or in various combinations, have been cited as measures of "parenting style" (Sommer et al., 2000) and "parenting attitudes" (Meyers & Battistoni, 2003). Similarly, "parenting style" has been measured not only by various combinations of the AAPI subscales but also by the Block's Child Rearing Practices Report (Aunola & Nurmi, 2005). In the current paper, we will focus on the aspects of parenting style measured most commonly in studies of cognitive readiness: empathetic awareness, physical punishment, and authoritarian parenting (that is, high levels of punitive control and rigidity).

Parenting style has been positively correlated with both family income and knowledge of child development (Stevens, 1984). Parenting style characterized by psychologically and behaviorally controlling parents, in combination with affection, has been shown to affect the number of problem behaviors displayed by preschool children.

Specifically, mothers who utilize high levels of both psychological control (control by guilt; for example, "I let my child see how disappointed and ashamed I am if he/she misbehaves") and affection (for example, "I often show my child that I love him/her") in their parenting practices have children who show increases in antisocial behavior and depressive symptoms (Aunola & Nurmi, 2005). In contrast, mothers who utilize high levels of behavioral control (for example, "If my child misbehaves I usually rebuke him/her") and low levels of psychological control have children with lower levels of antisocial problem behaviors (Aunola & Nurmi, 2005). Finally, a high level of parental warmth displayed in parenting style has been shown to indirectly lower levels of child's externalizing problems (for example, aggression and hyperactivity); this process was mediated by the child's self-regulation skills (Eisenberg et al., 2005).

Negative and punitive parenting styles have been related to children's behavior problems, as well (Crockenberg, 1987; Spieker, Larson, Lewis, Keller & Gilchrist, 1999). In children, parental controlling behavior has been related to more internal locus of control beliefs; however, in adolescents, parental controlling behavior has been related to more external locus of control beliefs (Morton & Mann, 1998). Thus, although controlling behavior may help younger children to develop a sense of control over their own lives, continuing this same level of control with adolescents may result in feelings that some outside force controls their life. Spieker and colleagues (1999) found that mothers who used high levels of negative control, characterized by both verbal and physical negative tactics, had children with higher levels of disruptive behavior problems in preschool. Additionally, in comparison with the children of mothers who used more negative control in their parenting, children whose mother's used lower levels of negative

control had decreased disruptive behaviors over time. Similarly, Crockenberg (1987) found that punitive mothers had toddlers who were uncooperative and angry and who attempted to withdraw from their mothers. This effect was exacerbated when the child was rated as having a difficult or irritable temperament as an infant. Finally, adolescent mothers are more likely to use corporal punishment than their older counterparts, and those who do use corporal punishment tend to do so with a greater frequency (Gershoff, 2002).

The effects of parenting style on children have long-term impacts. Parenting styles characterized by warmth and involvement have been shown to lower the risk of early parenthood (Serbin & Karp, 2004). Flouri (2004) indicated that daughters' satisfaction with their own lives as adults was related to their mothers' attitudes toward authoritarian parenting, while daughters' self-efficacy ratings were related to their mothers' attitudes toward child autonomy. Specifically, mothers with the least authoritarian attitudes, measured when their daughters were five years old, had daughters with the highest levels of life satisfaction as adults. Mothers who had the most negative attitudes toward child autonomy had daughters with the highest levels of self-efficacy as adults. Finally, it has been shown that adolescents who experience negative parenting styles from their parents tend to use these same styles with their own children (Serbin & Karp, 2004), leading to a cycle of negative intergenerational parenting practices.

Parenting Attitudes

The final component of cognitive readiness to parent is maternal parenting attitude, generally towards role-reversal and child-centeredness. Role-reversal refers to a

mother's expectations that her child will care for her and meet her needs; child-centeredness refers to the mothers' attitudes towards parenting in general, as well as to her willingness to put her child's needs above her own (Sommer et al., 2000; Whitman et al., 2001). Parenting attitudes have been positively correlated with mothers' knowledge of infant and child development, mothers' knowledge of skills and behaviors that are useful in the parenting role, maternal empathy towards the child's needs, maternal self-esteem, and maternal intelligence (Hurlbut et al., 1997; Whitman et al., 2001). Parenting attitudes have been negatively correlated with maternal internalizing behavior (for example, depression and anxiety), and teens have been shown to have more negative attitudes toward parenting than their adult counterparts do (Whitman et al., 2001). Finally, parental child-centeredness has been related to more internal control beliefs (for example, "If I want to do well in school, it's up to me to do it") in both children and adolescents (Morton & Mann, 1998).

Few data concerning parenting attitudes exist outside of the correlational studies discussed above. There is some evidence that maternal role reversal predicts social and attention problems in daughters but not in sons (Macfie, Houts, McElwain & Cox, 2005). Role-reversal has been associated with a history of sexual abuse and unsatisfactory intimate relationships by some (Alexander, Teti & Anderson, 2000). In contrast, others have found that mothers who were victims of sexual abuse were less likely to expect their children to fill their emotional needs (Meyers & Battistoni, 2003). Scott and Hill (2001) found that adolescents improved in their attitudes toward role-reversal between the prenatal period and 20 weeks postpartum; however, there is contrasting evidence that parenting styles high in role reversal are stable and transferred from parent to child,

creating an intergenerational cycle of poor parenting practices (Macfie, McElwain, Houts & Cox, 2005).

Cognitive Readiness to Parent

In most research, a cognitive readiness composite score was created by combining scores from the variables of parenting knowledge, parenting style, and parenting attitudes. This composite score was then used to examine the relations between cognitive readiness and various other factors. The individual factors that compose the cognitive readiness composite score were rarely examined. Next, the available research on cognitive readiness to parent is examined.

Sommer and colleagues (1993) examined the differences in cognitive readiness between teen and adult mothers during pregnancy and six months postpartum. They found that adults had more parenting knowledge than teens did both prenatally and six months after giving birth. Adult mothers also scored higher than teen mothers on measures of parenting style at both time points. However, the differences in knowledge levels and parenting style were no longer significant when the researchers controlled for IQ, SES, race, and educational levels.

There seems to be some relationship between cognitive readiness and child and maternal intelligence. Cognitive readiness to parent, in combination with maternal perceptions of the parenting role, appears to have an impact on children's intelligence scores as measured at age 3 (Miller, Miceli, Whitman & Borkowski, 1996). Specifically, mothers who scored lower on cognitive readiness to parent during the prenatal period had children who scored lower on intelligence measures at age three. Furthermore, the

relationship between child intelligence scores and cognitive readiness was mediated by maternal perceptions. Cognitive readiness also appears to have a direct impact on children's levels of internalizing behaviors, with parents who are less cognitively prepared having children who display higher rates of internalizing behavior problems. This relationship was partially mediated by maternal perceptions of the parenting role. Mothers who perceived their children and their role as a parent as more difficult and stressful reported that their children displayed higher rates of internalizing behavior problems than mothers who perceived their children and role as a parent as less difficult and stressful (Miller et al., 1996). Finally, studies have indicated that mothers with higher cognitive readiness also have higher intelligence scores (Mylod, Whitman & Borkowski, 1997; Whitman et al., 2001).

Other evidence suggests that maternal cognitive readiness is more related to child behavioral outcomes than to child cognitive outcomes (Dukewich, Borkowski & Whitman, 1999). Sommer and colleagues (2000) found that maternal cognitive readiness predicted child adaptive behaviors as measured by the Vineland Adaptive Behavior Scales. Higher scores on cognitive readiness to parent predicted higher scores on adaptive behavior. However, cognitive readiness to parent had no impact on children's cognitive-linguistic development. Additionally, when the component variables of parenting attitude, parenting knowledge, and parenting style were examined separately, only the construct of parenting style was predictive of adaptive behaviors.

Preliminary evidence indicates a relationship between maternal cognitive readiness and measures of child attachment to the mother. When children classified as securely attached, insecurely attached, or disorganized in their attachment were examined

it was found that mothers who were more cognitively prepared for parenting before their children were born were more likely to have securely attached children. Mothers who scored lower on cognitive readiness before giving birth were more likely to have children who were classified as insecurely attached or disorganized (Lounds, Borkowski, Whitman, Maxwell & Weed, 2005).

O'Callaghan, Borkowski, Whitman, Maxwell, and Keogh (1999) also examined cognitive readiness as a construct composed solely of knowledge of infant development and parenting attitudes. In contrast to their previous research, they did not include parenting style within the cognitive readiness construct. Instead, they included both parenting style and maternal interaction as factors measuring a global construct of parenting. The authors found that the cognitive readiness construct was predictive of the parenting construct, a finding indicating that the individual variables generally grouped under the construct of cognitive readiness (that is, knowledge of infant and child development and parenting style) may actually influence one another directly. In other words, knowledge of infant and child development may predict parenting style.

The Present Study

The literature provides an examination of the overall model and of the cognitive readiness construct; however, there has been limited research on relationships among the component variables that make up this construct. It has been demonstrated repeatedly that the variables that compose the cognitive readiness construct are positively correlated with one another (Miller et al., 1996; O'Callaghan et al., 1999; Whitman et al., 2001). To date, there has been little examination of how these variables might influence one

another. However, it was suggested by Elster et al. (1983) that child development knowledge enables a mother to interpret the infant's behavioral cues correctly and respond appropriately. The purpose of the current project was to partially fill a gap in the cognitive readiness literature by examining the relationships between the knowledge of infant development variable and the parenting style variable. The relationships predicted are shown in Figure 3.

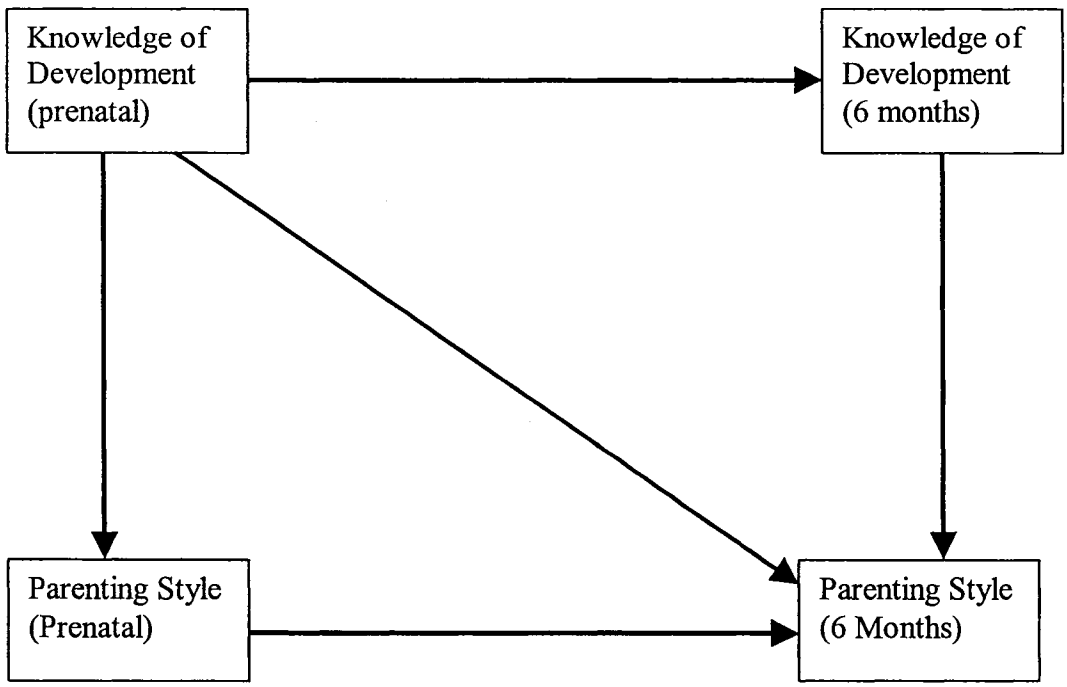

Figure 3: *Proposed relationships between knowledge of development and parenting style*

Aim 1.

Aim 1 was to examine differences in parenting style among adolescent, low-resource adult, and high-resource adult mothers.

Hypothesis. Based on previous research, it was expected that there would be significant differences in parenting style among the three groups. High-resource adult mothers were expected to score the highest, and adolescent mothers were expected to score the lowest.

Aim 2.

Aim 2 was to examine knowledge of infant development as a predictor of parenting styles as measured prenatally and at six months postpartum.

Hypothesis. It was expected that maternal knowledge of what a child is capable of doing would affect the mother's opinions on what are appropriate parenting practices and punishments for various ages. Thus, knowledge of infant development was expected to predict parenting style at both time points.

Aim 3.

Aim 3 was to examine maternal knowledge of development and maternal parenting style over time.

Hypothesis. It was expected that knowledge of development measured during the prenatal period would be predictive of knowledge of development measured six months postpartum. It was also expected that parenting style measured during the prenatal period would be predictive of parenting style measured six months postpartum.

Aim 4.

Aim 4 was to examine knowledge of development measured during the prenatal period as a predictor of parenting style measured six months postpartum after the effects of knowledge of development measured six months postpartum were controlled.

Hypothesis. It was expected that knowledge of development measured during the prenatal period would predict parenting style measured at six months postpartum after the

effects of knowledge of development measured during the six months postpartum assessment were controlled.

METHODS

Participants

The present study utilized data from the Parenting for the First Time Project, a four-site longitudinal study of teen parenting and neglect funded by the National Institute of Child Health and Human Development and the Robert Wood Johnson Foundation. Project participants were recruited from four separate catchment areas: Birmingham, Alabama; South Bend, Indiana; Kansas City, Kansas; and Washington, D.C. Adolescent participants were recruited from hospitals and clinics where the majority of Medicaid eligible teens received their prenatal care and/or gave birth. A sample of adult mothers was recruited from these locations to serve as an adult low-resource comparison group. Additionally, a second sample of adult mothers was recruited through doctors' offices and clinics to serve as an adult high-resource comparison group.

Inclusion criteria for the teen mothers were as follows: teens must be between the ages of 15 and 18 years at time of enrollment and must have no high school diploma or GED at time of enrollment. Low-resource adult mothers were required to be between the ages of 22 and 35 years and to have no more than 2 years of community college or vocational training at time of enrollment. Finally, adult high-resource mothers were required to be between the ages of 22 and 35 years and to have a minimum of 2 years of post-secondary education. Race was not included in the enrollment criteria, because samples were expected to reflect the racial composition of their geographical catchment

areas. There were 682 participants in the original sample; however, only 495 had data collected at both the prenatal and the six month time points. Of these 495, many were missing variables key to the current analyses (for example, IQ score or parenting style score). There were 312 mothers who had sufficient data to be included in the current analyses. Of these 312, 183 were adolescents, 62 were low-resource adults, and 67 were high-resource adults. Additional demographic information collected at six months postpartum is given in Table 1.

Procedure

Participants were randomly assigned to interviewers, and all interviewers received participants from all 3 groups. Interviewers were trained in administration of all materials before beginning data collection. Interviews were completed in various locations such as prenatal clinics, participants' homes, local libraries, and universities affiliated with the study. Prenatal interviews were administered orally, with response choices presented on cards for the Knowledge of Infant Development Inventory and the Parenting Style Questionnaire. Interviews done six months postpartum were primarily self-administered but were sometimes administered orally at participants' request. The Wechsler Abbreviated Scale of Intelligence (WASI) was administered only at the six-month postpartum interview. The WASI administrations followed the standard protocol outlined in the administration manual.

Table 1

Demographic Information as of Six Months Postpartum

	Adolescent (N = 183)	Low-Resource Adult (N = 62)	High-Resource Adult (N = 67)
Race	N (% of group)	N (% of group)	N (% of group)
African-American	129 (70.5%)	46 (74.2%)	32 (47.8%)
American-Indian	1 (0.5%)	1 (1.6%)	0 (0.0%)
Caucasian	25 (13.7%)	14 (22.6%)	30 (44.8%)
Latina	23 (12.6%)	1 (1.6%)	2 (3.0%)
Multi-racial	5 (2.7%)	0 (0.0%)	3 (4.5%)
Marital Status			
Single	91 (49.7%)	24 (38.7%)	16 (23.9%)
Married	6 (3.3%)	14 (22.6%)	37 (55.2%)
With a Partner	86 (47.0%)	22 (35.5%)	14 (20.9%)
Separated	0 (0.0%)	2 (3.2%)	0 (0.0%)
Education			
≤ 8th grade	4 (2.2%)	0 (0.0%)	0 (0.0%)
Some High School	98 (53.6%)	13 (21.0%)	0 (0.0%)
Completed High School	68 (37.2%)	27 (43.5%)	0 (0.0%)
Some College	8 (4.4%)	17 (27.4%)	48 (71.6%)
Some Vocational Training	5 (2.7%)	5 (8.1%)	2 (3.0%)
Some Graduate School	0 (0.0%)	0 (0.0%)	17 (25.4%)
IQ Scores			
≤ 70 (≥ 2 SD's below average)	11 (6.0%)	7 (11.3%)	0 (0.0%)
70 – 85 (≥ 1 SD below average)	60 (32.8%)	14 (22.3%)	6 (9.0%)
86-115 (within 1 SD of average)	111 (60.7%)	39 (62.9%)	39 (58.2%)
116-130 (≥ 1 SD above average)	1 (0.5%)	2 (3.2%)	21 (31.3%)
≥ 131 (≥ 2 SD above average)	0 (0.0%)	0 (0.0%)	1 (1.5%)
M's and SD's of study variables	M (SD)	M (SD)	M (SD)
Maternal age (in years)	18.05 (1.2)	26.0 (3.2)	28.0 (4.0)
Prenatal knowledge	44.1 (5.4)	45.5 (6.0)	51.0 (5.5)
6 month knowledge	45.1 (5.9)	47.0 (6.7)	52.5 (5.3)
Prenatal parenting style	104.3 (13.7)	108.3 (13.0)	115.3 (12.0)
6 month parenting style	105.6 (14.8)	112.2 (12.6)	117.1 (12.2)

Measures

Knowledge of infant development was assessed with a shortened version of the Knowledge of Infant Development Inventory (KIDI) that was created for use in the Early Head Start National Research Interview. The version of the KIDI utilized in the current study is a 13-item measure containing statements such as "All infants need the same amount of sleep," and "Five-month-olds understand what 'no' means." Responses were chosen from a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." Responses from all items are summed to form the total score for the measure. The KIDI has high internal consistency and high test-retest reliability ($\alpha = .82$ and $\alpha = .92$, respectively; MacPhee, 1981).

Parenting Style was assessed with a 27-item questionnaire composed of an empathetic awareness subscale (8 questions), a physical punishment subscale (10 questions), an abuse/neglect subscale (5 questions), and an authoritarian subscale (4 questions). The empathetic awareness and physical punishment subscales were taken from the Adult-Adolescent Parenting Inventory (Bavolek, 1985). The empathetic awareness subscale evaluates the mother's ability to identify and respond to her child's needs in an appropriate manner. The physical punishment subscale contains items designed to measure maternal attitudes toward the use of physical punishment. All items are written as statements, and respondents choose their level of agreement with each statement from a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." The empathetic awareness and physical punishment subscales have been shown to have internal consistency coefficients of .75 and .81, respectively (Bavolek,

1985). The abuse/neglect scale measures attitudes toward behaviors that reflect extreme physical punishment and neglect. The authoritarian subscale measures attitudes toward rigid and harsh parenting behaviors. The abuse/neglect and authoritarian subscales have been added in earlier studies to form the parenting style component of cognitive readiness (Mylod et al., 1997; Sommer et al., 2000). Responses from all items are summed to form a total parenting style score, with higher scores indicating more adaptive parenting styles. Cronbach's alpha for the current sample was .88 at the prenatal and .90 six months postpartum.

Maternal intelligence was assessed with the Vocabulary and Matrix Reasoning subscales of the Wechsler Abbreviated Scale of Intelligence (WASI). The subscales chosen are those recommended within the WASI manual when time constraints prohibit the administration of all four subscales. In the vocabulary subtest, participants are asked to define various words. In the matrix reasoning subtest, participants are shown various incomplete pictures and asked to complete the picture by selecting the missing piece from a group of five choices shown below the picture. Reliability coefficients for this two-subtest version of the WASI are as follows: .94 for age 15, .92 for age 16, .94 for ages 17-19, .93 for ages 20-24, and .95 for ages 25-34. (Psychological Corporation, 1999).

RESULTS

Preliminary Procedures

Groups were tested for significant differences on the demographic variables of race, marital status, maternal education, and IQ scores. Significant differences were found for all four variables; therefore, these variables were entered as covariates in all

further analyses. Race, marital status, and maternal education were dummy coded to create a set of dichotomous variables for each of these discrete variables. Each set was subsequently entered as a group in the regression equation as recommend by Tabachnick and Fidell (2001). Additionally, age was entered as a covariate to test for any age-related differences within groups. Outcome variables were tested for normality. Both variables met the criteria described by Tabachnick and Fidell (2001) for hierarchical linear regression, so no transformations were made to these variables. Finally, Pearson correlations were examined among the study variables, as shown in Table 2. Similar to previous studies, the current study revealed that knowledge of development, parenting style, maternal IQ scores, and maternal age were positively correlated with one another.

Table 2

Correlations Among Study Variables

	1	2	3	4	5	6
1) Prenatal Knowledge of Development	1.00	.664**	.617**	.492**	.532**	.385**
2) 6 Month Knowledge of Development		1.00	.565**	.581**	.580**	.388**
3) Prenatal Parenting Style			1.00	.721**	.455**	.335**
4) 6 Month Parenting Style				1.00	.473**	.370**
5) Maternal IQ					1.00	.386**
6) Maternal Age						1.00

** $p < .01$

Main Analyses

Aim 1

Analysis of variance was used to compare groups on the dependent variables of prenatal parenting style and parenting style measured six months postpartum. Groups were found to have significant differences on prenatal parenting style, F (2,309) = 17.27, $p < .001$, and on six month postpartum parenting style, F (2,309) = 18.85, $p < .001$. Post hoc analyses were run with the use of Tukey's LSD comparisons. These analyses revealed significant differences among all groups on both variables. Therefore, groups were separated for subsequent regression analyses.

Adolescent group

Aim 2. A series of hierarchical regression analyses was performed to test the hypothesized model in the teen group. First, prenatal knowledge of development was tested as a predictor of prenatal parenting style. After race, marital status, education level, age, and IQ scores were controlled, prenatal knowledge of development was a significant predictor of prenatal parenting style, and predicted an additional 12% of the variance in parenting style scores, F (13,169) = 7.87, $p < .001$, $\Delta R^2 = .122$. Although the demographic variables of race, education, and IQ score did account for significant amounts of variability in parenting style, marital status and age did not do so, (see Table 3).

Table 3

Adolescent Mothers Hierarchical Regression Analyses

Variables	B	SE	β	R^2	ΔR^2
Prenatal knowledge predicting prenatal parenting style					
Step 1	--	--	--	.107	.107***
Race					
Step 2	--	--	--	.107	.001
Marital Status					
Step 3	--	--	--	.180	.072**
Education					
Step 4	.828	.839	.070	.183	.003
Maternal Age					
Step 5	.192	.089	.152	.255	.072***
Maternal IQ					
Step 6	1.024	.178	.405	.377	.122***
Maternal Knowledge of Development					
6 month postpartum knowledge predicting 6 month postpartum parenting style					
Step 1	--	--	--	.089	.089**
Race					
Step 2	--	--	--	.102	.013
Marital Status					
Step 3	--	--	--	.196	.094**
Education					
Step 4	1.015	.885	.079	.203	.007
Maternal Age					
Step 5	.275	.092	.202	.291	.088***
Maternal IQ					
Step 6	1.031	.178	.413	.408	.117***
Maternal Knowledge of Development					
Prenatal knowledge predicting 6 month postpartum knowledge					
Step 1	--	--	--	.153	.153***
Race					
Step 2	--	--	--	.178	.025
Marital Status					
Step 3	--	--	--	.238	.060*
Education					
Step 4	.365	.340	.071	.241	.003
Maternal Age					
Step 5	.079	.036	.144	.313	.072***
Maternal IQ					
Step 6	.469	.072	.430	.451	.138***

Variables	B	SE	β	R^2	ΔR^2
Prenatal parenting style predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.089	.089**
Race					
Step 2	--	--	--	.102	.013
Marital Status					
Step 3	--	--	--	.196	.094**
Education					
Step 4	.888	.804	.069	.203	.007
Maternal Age					
Step 5	.223	.084	.165	.291	.088***
Maternal IQ					
Step 6	.586	.067	.543	.511	.220***
Prenatal Maternal Knowledge of Development					
Prenatal knowledge predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.089	.089**
Race					
Step 2	--	--	--	.102	.013
Marital Status					
Step 3	--	--	--	.196	.094**
Education					
Step 4	1.020	.887	.080	.203	.007
Maternal Age					
Step 5	.260	.095	.191	.291	.088***
Maternal IQ					
Step 6	.970	.200	.389	.408	.117***
6 Month Maternal Knowledge of Development					
Step 7	.144	.209	.053	.409	.002
Prenatal Maternal Knowledge of Development					

-- Because these variables were entered as sets of dummy coded variables, there is no single value to enter into table.

*** $p < .001$

** $p < .01$

* $p < .05$

Knowledge of development measured six months postpartum was tested as a predictor of parenting style measured six months postpartum. Again, race, marital status, education level, age, and IQ scores were first entered into the regression equation; only race, education level, and IQ scores accounted for significant amounts of variance. Six month knowledge of development did significantly account for an additional 11% of the variance in six month parenting style, F (13,169) = 8.95, $p < .001$, $\Delta R^2 = .117$, as shown in Table 3.

Aim 3. Prenatal knowledge of development was found to be predictive of six month postpartum knowledge, F (13,169) = 10.68, $p < .001$, $\Delta R^2 = .138$; and prenatal parenting style was predictive of six month postpartum parenting style; F (13,169) = 13.56, $p < .001$, $\Delta R^2 = .220$. As in previous analyses with this group, this analysis showed that race, education level, and IQ scores accounted for significant amounts of variance in six month variables, but that marital status and age did not do so.

Aim 4. Finally, prenatal knowledge of development was tested as a predictor of six month postpartum parenting style. Race, marital status, education level, maternal age, IQ scores, and 6 month knowledge of development were entered into the equation before prenatal knowledge of development in order to control for the effects of these variables. After these variables were controlled, prenatal knowledge of development did not significantly add to the equation, F (14,168) = 8.32, $p = .493$, $\Delta R^2 = .002$. The full model for the adolescent group is shown in Figure 4.

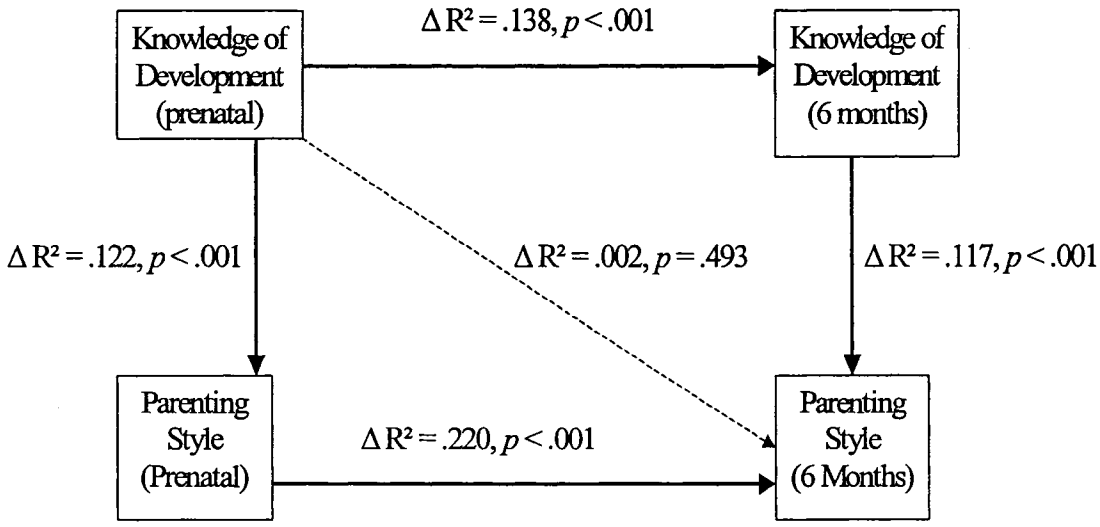

Figure 4: *Model of adolescent mothers' knowledge of development predicting parenting style*

Low-Resource Adult Group

Aim 2. The same regression equations that were performed on the adolescent group data were conducted with the adult low-resource group. As was the case in the adolescent group, knowledge of development measured during the prenatal period predicted parenting styles endorsed during the prenatal period, $F(12,49) = 6.86, p < .001, \Delta R^2 = .222$. After demographic variables were controlled, knowledge of development significantly accounted for 22% of the variance in parenting style. However, in contrast to the findings for the adolescent group, the only demographic variable that significantly added to the equation was maternal IQ scores (see Table 4).

Similar to the adolescent group, knowledge of development as measured six months postpartum was a predictor of parenting styles endorsed six months postpartum, $F(12,49) = 6.49, p < .01, \Delta R^2 = .081$. However, in the low-resource adult group,

Table 4

Low-Resource Adult Mothers Hierarchical Regression Analyses

Variables	B	SE	β	R^2	ΔR^2
Prenatal knowledge predicting prenatal parenting style					
Step 1	--	--	--	.087	.087
Race					
Step 2	--	--	--	.102	.016
Marital Status					
Step 3	--	--	--	.195	.092
Education					
Step 4	.268	.392	.066	.203	.009
Maternal Age					
Step 5	.275	.098	.321	.405	.202***
Maternal IQ					
Step 6	1.227	.227	.570	.627	.222***
Maternal Knowledge of Development					
6 month postpartum knowledge predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.076	.076
Race					
Step 2	--	--	--	.111	.035
Marital Status					
Step 3	--	--	--	.349	.238**
Education					
Step 4	.076	.394	.019	.356	.007
Maternal Age					
Step 5	.215	.110	.260	.532	.176***
Maternal IQ					
Step 6	.789	.246	.419	.614	.081**
Maternal Knowledge of Development					
Prenatal knowledge predicting					
6 month postpartum knowledge					
Step 1	--	--	--	.186	.186**
Race					
Step 2	--	--	--	.214	.029
Marital Status					
Step 3	--	--	--	.274	.059
Education					
Step 4	.275	.189	.131	.296	.022
Maternal Age					
Step 5	.186	.047	.423	.538	.242***
Maternal IQ					
Step 6	.492	.109	.445	.673	.135***
Prenatal Maternal Knowledge of Development					

Variables	B	SE	β	R^2	ΔR^2
Prenatal parenting style predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.076	.076
Race					
Step 2	--	--	--	.111	.035
Marital Status					
Step 3	--	--	--	.349	.238**
Education					
Step 4	.136	.347	.035	.356	.007
Maternal Age					
Step 5	.190	.093	.229	.532	.176***
Maternal IQ					
Step 6	.500	.100	.517	.691	.159***
Prenatal Maternal Knowledge of Development					
Prenatal knowledge predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.076	.076
Race					
Step 2	--	--	--	.111	.035
Marital Status					
Step 3	--	--	--	.349	.238**
Education					
Step 4	.144	.365	.037	.356	.007
Maternal Age					
Step 5	.215	.102	.259	.532	.176***
Maternal IQ					
Step 6	.347	.270	.184	.614	.081**
6 Month Maternal Knowledge of Development					
Step 7	.745	.246	.358	.676	.062**
Prenatal Maternal Knowledge of Development					

-- Because these variables were entered as sets of dummy coded variables, there is no single value to enter into table.

*** $p < .001$

** $p < .01$

* $p < .05$

education level and IQ scores significantly accounted for variance in parenting styles at six months postpartum, whereas race, marital status, and age did not do so (see Table 4).

Aim 3. As in the adolescent group, prenatal knowledge of development predicted six month postpartum knowledge of development, $F(12,49) = 8.40, p < .001, \Delta R^2 = .135$; and prenatal parenting style predicted six month postpartum parenting style, $F(12,49) = 9.14, p < .001, \Delta R^2 = .159$. Once again, there were differences in the importance of demographic variables between the two groups. For the low-resource adult group, race and IQ scores accounted for significant variance in six month postpartum knowledge of development; however, marital status, education, and age did not do so. Education level and IQ scores accounted for significant variance in parenting styles endorsed six months postpartum; race, marital status, and age did not do so.

Aim 4. Finally, prenatal knowledge of development was tested as a predictor of parenting styles endorsed six months postpartum after race, marital status, education, maternal age, IQ scores, and six month postpartum knowledge of development were controlled. In contrast to the findings for the adolescent group, those for the low-resource adult group indicated that prenatal knowledge of development did account for significant variance in parenting styles endorsed six months postpartum, $F(13,48) = 7.69, p < .01, \Delta R^2 = .062$. The full model for the adult low-resource group is shown in Figure 5.

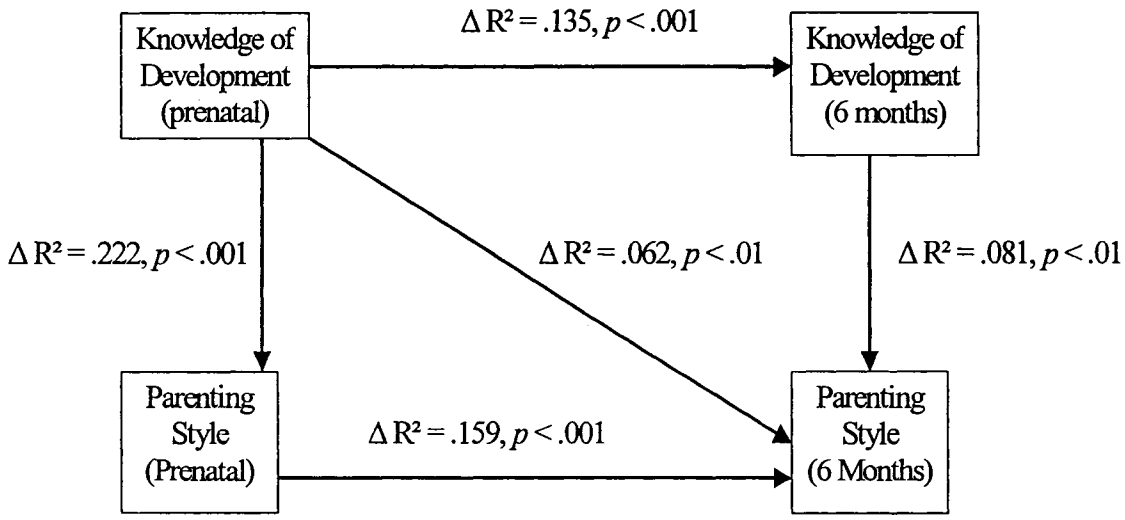

Figure 5: *Model of low-resource adult mothers' knowledge of development predicting parenting style*

High-Resource Adult Group

Aim 2. Last, the hierarchical linear regressions were conducted on the high-resource adult group. The results for the high-resource adult group can be found in Table 5. After race, marital status, education levels, maternal age, and IQ scores were controlled, prenatal knowledge of development did account for a significant amount of variance in prenatal endorsement of parenting styles, $F(10,56) = 4.16, p = .001, \Delta R^2 = .124$. Interestingly, for this high-resource group of mothers, race was the only demographic variable that explained a significant amount of variance in prenatal parenting style. Six months postpartum, knowledge of development still accounted for a significant amount of variance in parenting styles endorsed, $F(10,56) = 6.89, p < .001, \Delta R^2 = .140$. At six months postpartum, both race and age accounted for a significant amount of variance in parenting style; however marital status, education level, and IQ scores did not do so.

Table 5

High-Resource Adult Mothers Hierarchical Regression Analyses

Variables	B	SE	β	R^2	ΔR^2
Prenatal knowledge predicting prenatal parenting style					
Step 1	--	--	--	.179	.176**
Race					
Step 2	--	--	--	.201	.024
Marital Status					
Step 3	--	--	--	.238	.038
Education					
Step 4	.640	.353	.216	.273	.035
Maternal Age					
Step 5	.104	.119	.111	.302	.029
Maternal IQ					
Step 6	.913	.263	.420	.426	.124**
Maternal Knowledge of Development					
6 month postpartum knowledge predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.293	.293***
Race					
Step 2	--	--	--	.310	.017
Marital Status					
Step 3	--	--	--	.322	.012
Education					
Step 4	1.032	.317	.343	.377	.055*
Maternal Age					
Step 5	.156	.105	.164	.412	.035
Maternal IQ					
Step 6	1.139	.273	.501	.552	.140***
Maternal Knowledge of Development					
Prenatal knowledge predicting					
6 month postpartum knowledge					
Step 1	--	--	--	.385	.385***
Race					
Step 2	--	--	--	.398	.012
Marital Status					
Step 3	--	--	--	.426	.028
Education					
Step 4	-.130	.134	-.098	.431	.005
Maternal Age					
Step 5	.012	.046	.030	.442	.011
Maternal IQ					
Step 6	.420	.102	.431	.573	.131***
Maternal Knowledge of Development					

Variables	B	SE	β	R^2	ΔR^2
Prenatal parenting style predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.293	.293***
Race					
Step 2	--	--	--	.310	.017
Marital Status					
Step 3	--	--	--	.322	.012
Education					
Step 4	.431	.256	.143	.377	.055*
Maternal Age					
Step 5	.085	.083	.089	.412	.035
Maternal IQ					
Step 6	.681	.086	.668	.724	.312***
Maternal Knowledge of Development					
Prenatal knowledge predicting					
6 month postpartum parenting style					
Step 1	--	--	--	.293	.293***
Race					
Step 2	--	--	--	.310	.017
Marital Status					
Step 3	--	--	--	.322	.012
Education					
Step 4	1.013	.322	.336	.377	.055*
Maternal Age					
Step 5	.147	.108	.155	.412	.035
Maternal IQ					
Step 6	1.073	.314	.472	.552	.140***
6 Month Maternal Knowledge of Development					
Step 7	.117	.272	.053	.553	.002
Prenatal Maternal Knowledge of Development					

-- Because these variables were entered as sets of dummy coded variables, there is no single value to enter into table.

*** $p < .001$

** $p < .01$

* $p < .05$

Aim 3. Similar to the findings for the adolescent and low-resource adult groups, those for this group revealed that knowledge of development measured prenatally predicted knowledge of development measured six months postpartum, F (10,56) = 7.52, $p < .001$, $\Delta R^2 = .131$, and that parenting styles endorsed in the prenatal period accounted for a significant amount of variance in parenting styles endorsed six months postpartum, F (10,56) = 14.67, $p < .001$, $\Delta R^2 = .312$. Only race accounted for a significant amount of variance in knowledge of development at six months postpartum. For endorsement of parenting styles, both race and maternal age predicted significant amounts of variance in six month postpartum scores.

Aim 4. For the final equation, the adult high-resource group was more similar to the adolescent group than to the adult low-resource group, in that knowledge of development measured prenatally did not account for a significant portion of the variance in parenting styles endorsed six months postpartum after race, marital status, education, maternal age, IQ scores, and knowledge of development measured at six months postpartum were controlled, F (11,55) = 6.19, $p = .668$, $\Delta R^2 = .002$. Race, maternal age, and knowledge of development measured during the prenatal period accounted for significant amounts of variance in six month postpartum endorsement of parenting style; however, marital status, education level, and IQ scores did not do so. The adult high-resource model is shown in Figure 6.

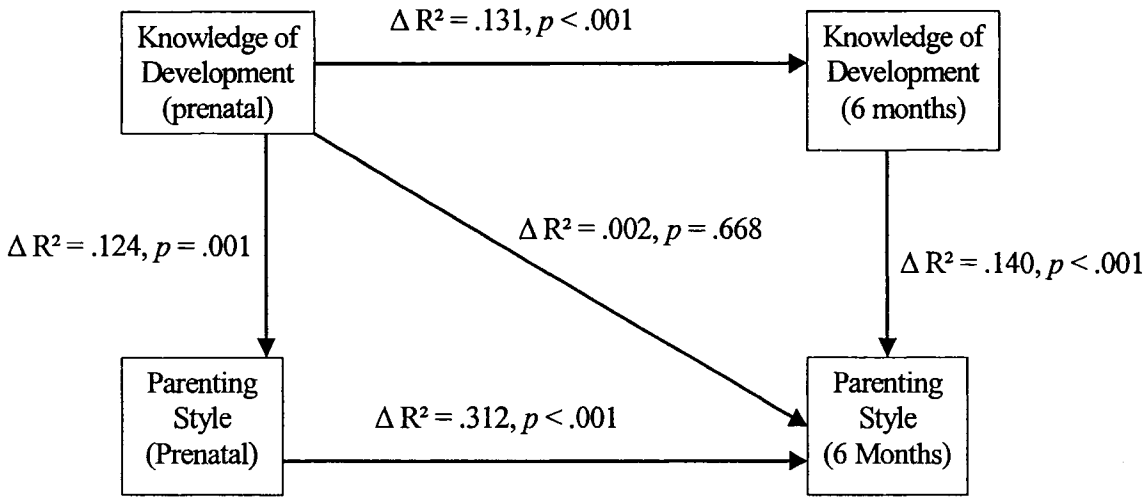

Figure 6: *Model of high-resource adult mothers' knowledge of development predicting parenting style*

DISCUSSION

Although knowledge of development and parenting style have been examined as components of cognitive readiness and as individual variables predicting outcomes for adolescent mothers and their children, there has been no examination of how these variables may impact one another. The present study examined differences among knowledge of development and parenting style in adolescent, low-resource adult, and high-resource adult mothers during the prenatal period and again six months after the mothers had given birth. Additionally, the variables of knowledge of development and parenting style were examined across time: first, before the expectant mother gave birth, and then again six months after these mothers became parents. Finally, prenatal knowledge of development was examined as a predictor of parenting styles endorsed six months after the women gave birth.

Aim 1: Group Differences in Parenting Style

As expected, group differences were found in parenting style measured during pregnancy and six months after mothers gave birth. At both time points, high-resource adult mothers scored the highest, and adolescent mothers scored the lowest. Although the difference between adolescent mothers and adult mothers during pregnancy has been documented in previous studies (Sommer et al., 2003; Whitman et al., 2001), the differences at six months postpartum are in contrast to earlier research findings indicating that differences between adults and adolescents during the prenatal period were no longer present six months postpartum (Whitman et al., 2001). Additionally, in contrast to previous studies, the present study further subdivided the adult group into low-resource mothers, who were more similar to the adolescents in education levels and IQ scores, and high-resource mothers, who had education levels and IQ scores significantly higher than those of either of the other groups. The differences found among all three groups add to the previous literature by exploring group differences between the two types of adult mothers and comparing both to the adolescent mother group.

Aim 2: Knowledge of Development Predicts Parenting Style

Knowledge of infant development did appear to predict endorsement of parenting styles in adolescent mothers, low-resource adult mothers, and high-resource adult mothers at both time points. However, the difference in variance explained by knowledge of development among groups was noteworthy. During the prenatal period, knowledge of development explained a lower percentage of variance in parenting style

for adolescents and high-resource adult mothers than for low-resource adult mothers. Knowledge of development explained approximately 22% of the variance in parenting style for adult low-resource mothers during the prenatal period. For adolescents and adult high-resource mothers, knowledge of development explained approximately 12% of the variance in parenting styles.

Six months after birth, the variance explained by six month knowledge changed little for adolescent and high-resource adult mothers, with knowledge of development explaining 12% and 14%, respectively, of the variance in parenting styles endorsed. However, for the low-resource adults, six month postpartum knowledge explained only 9% of the variance in parenting style. The difference between the importance of knowledge of development during the prenatal period and the importance of knowledge of development six months postpartum distinguishes the adult low-resource group from the other two groups. It is possible that, whereas knowledge of development influences the parenting styles that these mothers feel they should endorse in the prenatal period, the realities of parenting are much different from what the mothers supposed before they actually became parents themselves. Therefore, the differences in these two time points may reflect differences between the parenting styles that mothers feel they should endorse and the actual parenting styles the mothers do endorse as new mothers. The relative stability of the variance predicted by knowledge in the adolescent and high-resource adult groups as compared to the low-resource adult group may be reflective of some factors that were unaccounted for here, such as differences in social support or parental stress.

Aim 3: Knowledge of Development and Parenting Style Across Time

As expected, for all groups prenatal knowledge of development was predictive of six month postpartum knowledge of development, and prenatal parenting style was predictive of six month postpartum parenting style. Thus, it appears that knowledge of development and parenting style are relatively stable across time and that prior knowledge and style predict later scores.

Aim 4: Prenatal Knowledge Predicts Six Month Parenting Style

Relationships between prenatal knowledge of development and six month postpartum parenting style appear to differ among the three groups examined in the present study. For the adult low-resource group only, knowledge measured before birth predicted parenting styles endorsed six months after mothers had begun their role as a parent. Adolescent mothers and high-resource adult mothers, in contrast, did not show an effect of prenatal knowledge of development on parenting styles endorsed six months postpartum; for these two groups, knowledge of development was only predictive of parenting styles endorsed when both variables were measured at the same point in time.

It is possible that, for adolescents and adult high-resource mothers, knowledge of development does not change a significant amount over the first few months of parenting. In the present sample, knowledge scores at six months postpartum change little from scores measured during the prenatal period. Therefore, controlling for knowledge measured at six months postpartum could effectively eliminate knowledge measured prenatally as a predictor of variance. Alternatively, prenatal knowledge could simply

play a much less important role in endorsement of parenting styles for adolescents and high-resource adult mothers than it does for low-resource adult mothers, as indicated by the differences in variance explained by prenatal knowledge among the groups. It could be that other factors that were unaccounted for here, such as support from the participants' mothers, partners, or other family members, explain more of the variance in the endorsement of parenting styles than the mothers' knowledge of infant development does for adolescent and high-resource adult mothers.

Influence of Demographic Variables

Interestingly, the extent to which demographic variables influenced parenting style appeared to differ among the groups examined, as well. The only demographic variable that seemed to have no impact on any of the groups was marital status. However, among the other demographic variables, there were interesting differences among the three groups. Although race played an important role for both adolescent and high-resource adult mothers, it appeared to have no impact on parenting styles endorsed by low-resource adult mothers. Education levels had an impact on the parenting styles endorsed by adolescents and sometimes on those endorsed by adult low-resource mothers. However, this variable did not affect the parenting styles endorsed by adult high-resource mothers. Maternal age did not affect outcomes for adolescent mothers or for low-resource adult mothers, but it did significantly impact outcomes for high-resource adult mothers. Finally, maternal IQ scores accounted for a significant amount of variance in outcomes for adolescent mothers and adult low-resource mothers but surprisingly seemed to have no effect on adult high-resource mothers' outcomes.

It is possible that the differences in the importance of demographic variables among groups are simply reflective of group characteristics and that some demographic variables are of relatively little importance for certain groups. On the other hand, it may be that some groups examined here did not have sufficient variety on certain variables to detect the influence of that demographic variable. For example, the adult low-resource group contained very little variability with respect to race. This group was primarily African-American, with only a few mothers of other races included. The lack of significant findings for racial effects may reflect the homogenous nature of this group rather than an actual lack of importance of race on the variable of parenting style.

Another possibility is that variables may be significant only at a certain cut off point and beyond. Maternal IQ scores, for instance, may have a significant impact only if they fall within a certain range. The high-resource adult group had no scores more than two standard deviations below average and had only a few scores more than one standard deviation below average. However, this group had the vast majority of the scores in the above average range and was the only group with a score more than two standard deviations above average. It could be that the scores for this group were above some cut off point after which IQ no longer impacts parenting style.

Finally, it is possible that some of the demographic variables examined here are influenced by other, unaccounted for, variables that suppress, moderate, or otherwise impact the effect of these demographic variables. Financial stability could protect against effects of low education levels, or social support could moderate the effects of marital status. Although it is impossible to understand the differences in the significance of demographic variables found among these groups with the data available, it is important

to note these differences when attempting to understand parenting style among different groups of mothers.

Limitations

There are several limitations to the current study. First, it was not possible to obtain a random sample of mothers for these three groups; therefore, the generalizability of the findings is limited. Mothers who consented to enroll in a study of parenting may have been more interested in becoming good mothers than those who did not wish to enroll. The decision to enroll in the study may indicate an underlying difference between mothers who enrolled and those who did not enroll, and the findings presented here may not apply to mothers who chose not to enroll.

Second, groups were fairly homogenous on several demographic variables; therefore, the results may be limited to those specific groups. For example, the results found for adult high-resource mothers may not apply to high-resource mothers with IQ scores below 70, and the results for adult low-resource mothers may not be indicative of results that would be found with multiethnic adult low-resource mothers. There was only one adolescent group in the current study; however, adolescent mothers may vary widely in IQ, income, social support, and other resources. When considering the results presented here, one must keep in mind the specifications of these three groups and be careful not to overgeneralize to other groups.

Finally, it was not possible to examine all three components of cognitive readiness in the current study. Parenting attitudes may influence knowledge of development, parenting styles, or both in ways that are unaccounted for here. Some of

the differences found among groups in the current study could be explained by differences in parenting attitudes of mothers. Although the current study adds valuable information concerning the impact of knowledge of development on parenting style, it is not possible to gain a clear understanding of how the construct of cognitive readiness influences maternal stress and child outcomes without examining all three components that make up this construct.

Implications

There are several implications of the current study for future research and work with both adolescent and adult mothers. As previous studies have reported, mothers with higher knowledge of development reported more adaptive parenting styles (Miller et al., 1996; Mylod et al., 1997; Sommer et al., 2000; Whitman et al., 2001). Therefore, knowledge of development could be targeted as a marker of parenting styles endorsed, and increasing knowledge of development in prenatal interventions could promote more healthy parenting styles for adolescent and adult mothers. Furthermore, for adult low-resource mothers, these interventions could have a longer impact, with prenatal increases in knowledge impacting parenting styles endorsed six months after the mother begins her parenting responsibilities.

Adolescents could be targeted through school programs both for adolescent mothers and for the general student population. Although adolescents who are pregnant or have children are especially in need of parenting knowledge, it is likely that most teens will eventually become parents at some point during their lifetime. Therefore, it would be beneficial for all students to receive instruction on the development of infants to

improve future parenting styles. Adult low-resource mothers could be targeted through comprehensive care clinics throughout communities. Although it would not be possible to make classes on knowledge of development mandatory for this group, it is possible to offer free courses to all mothers who are interested.

In contrast, the adult high-resource group may be the most difficult to target. The increase in the use of private practice doctors by this group makes it difficult to target these individuals for services. There may also be a stigma associated with the acceptance of services in this group that prevents many of these mothers from seeking help. Under the current system, even if they do seek help they are often turned away because of income levels or personal resources. Developing classes on the knowledge of development, and making them open to all mothers regardless of income or resources would be an important first step in insuring that information on development is available and could help to improve the parenting styles of many mothers across income and age levels.

Second, the current study demonstrated differences between two groups of adult mothers and indicated the importance of various demographic variables to each. It also demonstrated differences between each of these groups and a group of adolescent mothers. Although it is often tempting to focus on the age difference between adolescent and adult mothers as the defining difference between these two groups, the present study has demonstrated that differences in other demographic variables may have a much larger impact on parenting style than the variable of age does.

Finally, the present study contributes the surprising finding that adolescent mothers are actually more similar to high-resource adult mothers than to low-resource

adult mothers in the stability of knowledge of development as a predictor of parenting style over time. Although it was not possible to determine what variables make these two groups different from the low-resource adult group with regard to stability, the current study opens up new avenues of comparisons for examination.

Future Directions

Future research involving more diverse groups should be conducted with these variables to determine the extent to which the results found here are applicable to the general population of mothers. Additionally, it would be interesting to compare the findings about mothers with those about fathers. Does fathers' knowledge of development predict their endorsement of parenting style? Because fathers play large roles in their children's lives, it is important to consider their knowledge of development and parenting styles, as well.

More longitudinal research is needed to examine knowledge of development as a predictor of parenting style. Although the current study did find evidence for prediction of parenting style at six months postpartum by prenatal knowledge of development in low-resource adult mothers, more research is needed to replicate this finding and to determine how long the effects of prenatal knowledge of development last. Longitudinal research would also allow for the examination of other variables such as social support and life stresses that may impact parenting style, and it would enable researchers to determine the impact of changes in demographic variables such as marital status and education levels on the endorsement of parenting styles.

Conclusions

This study replicates earlier findings indicating differences in parenting style among adolescent and adult mothers, with adult mothers having more adaptive parenting styles. In addition, the current study contributes evidence that there are also differences in parenting style among adult low-resource and adult high-resource mothers, with adult high-resource mothers demonstrating more adaptive parenting styles. The current study contributes information on how two of the variables that compose the cognitive readiness construct, knowledge of development and parenting style, are related to one another. Evidence from the current study indicates that knowledge of development is a useful variable for predicting parenting styles endorsed by mothers. For low-resource adult mothers, this prediction carries over from the prenatal period to the early months of parenting. For adolescent and high-resource adult mothers, however, the variables do not appear to be related across time points. More research is needed to better understand how adolescent parenting styles vary over time and what variables influence these changing styles.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD FOR HUMAN USE APPROVAL

OMB No. 0990-0263
Approved for use through 07/31/2005

Protection of Human Subjects
Assurance Identification/IRB Certification/Declaration of Exemption
(Common Rule)

Policy: Research activities involving human subjects may not be conducted or supported by the Department and Agencies adopting the Common Rule (56FR28001, June 18, 1991) unless the activities are exempt from or approved in accordance with the Common Rule. See section 101(b) of the Common Rule for exemptions. Institutions submitting applications or proposals for support must submit certification of appropriate institutional Review Board (IRB) review and approval to the Department or Agency in accordance with the Common Rule.

Institutions must have an assurance of compliance that applies to the research to be conducted and should submit certification of IRB review and approval with each application or proposal unless otherwise advised by the Department or Agency.

1. Request Type	2. Type of Mechanism	3. Name of Federal Department or Agency and, if known, Application or Proposal Identification No.
[] ORIGINAL [] CONTINUATION [] EXEMPTION	[] GRANT [] CONTRACT [] FELLOWSHIP [] COOPERATIVE AGREEMENT [] OTHER:_____	
4. Title of Application or Activity Predicting and Preventing Neglect in Teen Mothers		5. Name of Principal Investigator, Program Director, Fellow, or Other GUEST, KRISTI C

6. Assurance Status of this Project *(Respond to one of the following)*

[X] This Assurance, on file with Department of Health and Human Services, covers this activity;
Assurance Identification No. FWA00005960, the expiration date 11/24/06 IRB Registration No. IRB00000196

[ ] This Assurance, on file with *(agency/dept)*_____, covers this activity.
Assurance No._____, the expiration date_____ IRB Registration/Identification No._____ *(if applicable)*

[ ] No assurance has been filed for this institution. This institution declares that it will provide an Assurance and Certification of IRB review and approval upon request.

[ ] Exemption Status: Human subjects are involved, but this activity qualifies for exemption under Section 101(b), paragraph_____.

7. Certification of IRB Review (Respond to one of the following IF you have an Assurance on file)

[X] This activity has been reviewed and approved by the IRB in accordance with the Common Rule and any other governing regulations.
by: [X] Full IRB Review on (date of IRB meeting) 03-10-04 or [ ] Expedited Review on (date)
[ ] If less than one year approval, provide expiration date_____

[ ] This activity contains multiple projects, some of which have not been reviewed. The IRB has granted approval on condition that all projects covered by the Common Rule will be reviewed and approved before they are initiated and that appropriate further certification will be submitted.

8. Comments

Please note: UAB IRB Protocol Number is F010625008

Protocol subject to Annual continuing review.

Title
Predicting and Preventing Neglect in Teen Mothers

9. The official signing below certifies that the information provided above is correct and that, as required, future reviews will be performed until study closure and certification will be provided.	10. Name and Address of Institution
11. Phone No. *(with area code)* (205) 934-3789 12. Fax No. *(with area code)* (205) 934-1301 13. Email: smoore@uab.edu	University of Alabama at Birmingham 701 20th Street South Birmingham, AL 35294
14. Name of Official Ferdinand Urthaler, M.D.	15. Title Chairman, IRB
16. Signature Ferdinand Urthaler M.D.	17. Date 03-15-04

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