EARLY PARENTING TRAJECTORIES AND CHILDREN’S LANGUAGE DEVELOPMENT: DIFFERENCES BETWEEN ADOLESCENT AND ADULT MOTHERS

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Parents are recognized as primary contributors to children’s well-being (Borkowski, Ramey, & Bristol-Power, 2002). In parenting research, measures of parenting at one point in time are typically utilized to predict children’s development. However, since parenting is a dynamic process, there is a good reason to investigate parenting behaviors from a longitudinal framework. The present study used latent growth curve modeling to investigate changes in parenting over the first 18 months of life and how parenting is related to child language development at 24 months of age. Cognitive readiness to parent and support from fathers acted as predictors of initial parenting practices and changes in parenting over time. Group differences in these relationships were evaluated for adolescents and adult mothers.
## CONTENTS

### INTRODUCTION
- Parenting and Language Development ................................................. 1
- Adolescent Parenting and Language Development ................................. 2
- A Model of Adolescent Parenting ......................................................... 6
- Summing Up ......................................................................................... 10
- Present Study ..................................................................................... 16

### METHOD
- Participants ....................................................................................... 23
- Design and Procedures ..................................................................... 24
- Prenatal Measures ............................................................................. 26
- Measures of Parenting ...................................................................... 27
- Measures of Child Language Development ....................................... 29

### RESULTS
- Descriptive Information ................................................................... 30
- Overview of Latent Growth Curve Modeling ..................................... 34
- Measurement Invariance .................................................................. 37
- Growth Curve Models ....................................................................... 42
- Summary ......................................................................................... 55

### DISCUSSION
- Stability and Change in Parenting over Time ................................. 56
- Predictors of Parenting ..................................................................... 58
- Parenting and Children’s Language Development .............................. 59
- Limitations and Future Directions .................................................... 60
- Conclusions ..................................................................................... 62

### REFERENCES ..................................................................................... 63

### APPENDIX ......................................................................................... 73
INTRODUCTION

The ability to comprehend and express language is a critical skill for success across the lifespan. Delays in language development often have detrimental consequences in multiple domains such as reading achievement (McCardle, Scarborough, & Catts, 2001; Rescorla, 2005), social competence (Hortwitz et al., 2003; Irwin, Carter, & Briggs-Gowan, 2002), and behavioral functioning (Fagan & Iglesias, 2000; Qi & Kaiser, 2004). As in most areas of development, the formation of early language skills flows out of an interaction between genetic and environmental factors (Scarr & McCartney, 1983). For instance, parenting practices, in combination with children’s temperament, have been related to language development (Karrass & Braungart-Rieker, 2003). Evidence from twin studies has suggested, however, that although genes play a significant role in the development of language abilities, the greatest influence on early language may come from environmental factors (Kovas et al., 2005; Reznick, Corley, & Robinson, 1997; Spinath, Price, Dale, & Plomin, 2004).

Environmental effects are particularly influential during infancy, a time when parents are typically the primary constructors of their children’s early environments (Maccoby, 2002). Additionally, changes in caregiving practices during this period may serve to enhance or prohibit children’s acquisition of language. The present study investigated changes in parenting over the first 18 months of life and its relationship with children’s language development at 24 months. Differences in parenting trajectories were
evaluated between adolescent and adult mothers. Cognitive readiness to parent and mothers’ support from their partners were examined as predictors of parenting over time.

*Parenting and Language Development*

Parenting practices that have been found to facilitate language development usually involve a combination of warm, responsive parent-child interactions and the provision of environments with rich language exposure. Various researchers have verified that the quality of parent-child interactions is a critical influence on many aspects of child development, including language (see Borkowski, Ramey, & Bristol-Power, 2002). Similarly, early language exposure has been frequently cited as a strong predictor of language development and academic achievement (i.e., Hoff, 2003; Walker, Greenwood, Hart, & Carta, 1994). Hart (2000) discussed how both the quality of language experiences and the amount of opportunity for practicing language in the context of parent-child interactions are powerful factors in determining children’s language development. For parenting interventions, Hart suggested that children should be considered “partners” in an on-going conversation; a lack of partnership can lead to fewer opportunities for meaningful interactions that stimulate language learning (Hart, 2000). The next sections discuss how parents may place their children at-risk for language delays by providing them with lower-quality language environments and less-than-optimal parent-child interactions.

*Language exposure.* It is critical to emphasize that not all children grow up in equivalent learning environments and early differences can place children at high risk for problems in language development (Bradley, Corwyn, Burchinal, McAdoo, & Garcia
Coll, 2001). Particularly well documented is the association between differential early language exposure and later language and academic skills. In the groundbreaking study by Hart and Risley (1995), significant differences in the quantity and quality of language exposure were found for children from professional, working class, and welfare backgrounds. By age four an average child from a professional family was exposed to 45 million words, an average child from a working class family, 26 million words, and an average child from a welfare family, 13 million words. Not only did children of higher socioeconomic status experience a greater number of words, but they also heard more grammatically rich and encouraging words. This disparity of language exposure was significantly related to children’s language development, with children from welfare families having smaller vocabularies and slower language acquisition than children of professional families (Hart & Risley, 1995). These early language experiences also predicted language and reading achievement during elementary school (Walker et al., 1994).

Hart and Risley’s (1995) findings about socioeconomic status (SES) and language development have been replicated by several other investigators (Arriaga, Fenson, Cronan, & Pethick, 1998; Hoff & Naigles, 2002; Hoff, 2003). Parenting has subsequently been examined as a possible mechanism contributing to these language differences. For instance, Hoff (2003) found that the SES differences in language development were fully explained by maternal speech in the home. Given that maternal speech mediated the relationship between SES and language growth, Hoff noted that children from lower SES backgrounds benefited from enriched language environments, even when SES-related factors remain problematic. That is, specifically addressing early language experiences
for at-risk children may be effective in encouraging language growth, even if other co-
factors of poverty persist (Hoff, 2003).

Although the connection between environments that support language learning
and later language development is well established (Fuligni, Han, & Brooks-Gunn, 2004;
Hoff, 2003; Roberts, Jurgens, & Burchinal, 2005), little research has investigated how
exposure to language may change as children develop. One recent study investigated
changes in maternal speech in a sample of low-income families and found that mothers
increased the amount and variety of their talk as children aged from 14 to 36 months
(Rowe, Pan, & Ayoub, 2005). The study did not, however, examine how individual
differences in changes in maternal speech over time may have influenced children’s
language development. It may be that some mothers fail to increase the quality and
quantity of their talk, and this negative trajectory of language exposure operates as a risk
for language delays in their children.

Quality of parent-child interactions. Parents place their children at-risk for
language problems not only through the provision of less-rich language environments,
but also via inappropriate interactions with their infants. Interactions characterized by low
levels of warmth (Fuligni et al., 2004; Lohaus, Keller, Ball, Voelker, & Elben, 2004),
responsivity (Evans, Maxwell, & Hart, 1999; Tamis-LeMonda, Bornstein, Baumwell, &
Damast, 1996), and sensitivity (Baumwell, Tamis-LeMonda, & Bornstein, 1997; Landry,
Smith, Miller-Loncar, & Swank, 1997) have been associated with poorer language
abilities in children. For instance, in a study of children with identified language delays,
maternal sensitivity distinguished children with resolved language delays from children
with persistent language impairments (La Paro, Justice, Skibbe, & Pianta, 2004). There is
some evidence, however, that the maternal sensitivity, may change over time (Lohaus et al., 2004), highlighting the importance of examining how changes in interaction quality may impact language development.

Previous research has demonstrated how the quality of parent-child interactions and the general language learning environment operate as sources of risk for early language problems (Hoff, 2003; Tamis-LeMonda et al., 1996) and have spill-over effects into other developmental domains (Dieterich, Assel, Swank, Smith, & Landry, 2006; Landry, Miller-Loncar, Smith, & Swank, 2002). Additionally, there is some evidence suggesting that parenting behaviors may change as children age (Lohaus et al., 2004; Rowe et al., 2005). Less is known, however, about how changes in parenting over the first two years impact language development. For instance, it is possible that a mother will respond with appropriate verbal feedback for a very young infant, but then fail to provide rich language as the child matures. In contrast, as a child grows another mother will improve in her ability to recognize and respond to her child’s needs and subsequently begin adding more language based on her child’s interests. Little research has investigated how these different parenting patterns operate as sources of risk or protection for children’s language acquisition. By understanding how changes in parenting influence language development, the present study seeks to inform interventions regarding when particular groups of parents need more supports to help prevent language delays in their children.
Adolescent Parenting and Language Development

As previously mentioned, some parents have difficulty consistently providing their children with rich, stimulating language in the context of warm and responsive interactions. Adolescent mothers are one group particularly at-risk for problematic parenting, and as a result their children often demonstrate compromised developmental trajectories (Whitman, Borkowski, Keogh, & Weed, 2001). The following section addresses differences in parenting behaviors between adolescents and adults, how adolescent parenting relates to children’s language development, and how parenting may change over time.

Although the birth rate for adolescents has been declining steadily since the early 1990s, there are still over 420,000 births to teens each year (Martin et al., 2005). Given these high numbers, many researchers and policy makers currently consider adolescent childbearing to be a national health problem (Rich-Edwards, 2002; Scally, 2002). Becoming a parent as an adolescent can have far-reaching adverse effects for both mother and child. In comparison with mothers who delay childbirth until adulthood, teen mothers are more likely to experience economic disadvantage (Hobcraft & Kiernan, 2001; Moffitt & the E-Risk Study Team, 2002) and mental health problems (Barratt, Roach, Morgan, & Colbert, 1996; Deal & Holt, 1998). Children of adolescent mothers, however, tend to suffer the most from consequences associated with early parenthood (Maynard, 1997). Being born to an adolescent mother frequently places children at-risk for academic and socioemotional problems that persist into adulthood (Fergusson & Woodward, 1999; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001). In addition, developmental delays often
appear as early as the preschool years for these children, particularly in the area of
language (Sommer et al., 2000).

Parenting practices have been cited as mediating links between young maternal
age and children’s later poor outcomes (Keown, Woodward, & Field, 2001; Fergusson &
Woodward, 1999). Although adolescent parents are a heterogeneous group, on average,
they tend to engage in less-than-optimal early parenting behaviors. During interactions
with their infants, adolescent mothers are often less responsive (Luster & Vandenbelt,
1999), less warm (Keown et al., 2001), and more intrusive (Berlin, Brady-Smith, &
Brooks-Gunn, 2002) in comparison with adults. Teen mothers have also been shown to
provide their children with fewer words (Pomerleau, Scuccimarri, & Malcuit, 2003) and
less-stimulating home environments than adults (Burgess, 2005; Moore, Morrison, &
Greene, 1997).

Similar to the associations between parenting behaviors and language
development among adult samples (Hoff, 2003; La Paro et al., 2004), parenting by
adolescent mothers has been connected with child language development. For instance,
responsivity, sensitivity, warmth, verbal stimulation, and provision of intellectually
supportive environments during the first two years of life were related to both expressive
and receptive language abilities in sample of children born to teen mothers (Luster &
Vandenbelt, 1999). Similarly, in a study of adolescent parenting at 13 and 20 months,
maternal affect and verbal reciprocity, in addition to cumulative demographic risks, were
associated with better cognitive and linguistic functioning at 44 months (Hann, Osofsky,
& Culp, 1996). Adolescent mothers’ verbal stimulation and time spent encouraging and
actively supporting their children’s learning has also been associated with expressive and receptive language (Keown et al., 2001).

**Adolescent parenting over time.** Although multiple studies have documented adolescent mothers’ poor responsivity and diminished utilization of rich language in comparison with adults (i.e. Keown et al., 2001; Pomerleau et al., 2003), less is known regarding the extent to which teen mothers change their parenting behaviors over time. Despite suggestions for parenting to be conceptualized and measured as a dynamic process (Borkowski et al., 2002; Cummings, Davies, & Campbell, 2000; Holden & Miller, 1999), few prospective, longitudinal studies have examined changes in parenting behaviors over the first two years of life, particularly among adolescent mothers (i.e. Whiteside-Mansell, Pope, & Bradley, 1996). Cross-sectionally, however, it appears that teens display deficits in parenting throughout the early developmental period (Barratt & Roach, 1995; Luster & Vandenbelt, 1999).

Differences in parenting behaviors between adolescent and adults can be observed very shortly after children are born. In a study of non-feeding interactions at 6 weeks postpartum, teen mothers engaged in fewer affectionate behaviors (kissing, stroking) and more instrumental behaviors (diapering, fixing clothes) in contrast with adult mothers who demonstrated the opposite pattern (Krpan, Coombs, Zinga, Steiner, & Fleming, 2005). In another study observing parent-child behavior at 4 months of age, in comparison with adult single mothers, adolescent mothers smiled less, vocalized less, and provided their infants with fewer toys. When the same children were 12 months of age, teen mothers were less likely to respond appropriately to their infants’ exploration,
fussing, and vocalizations and were generally less verbally responsive than adult mothers (Barratt & Roach, 1995).

Other studies have likewise documented adolescent mothers’ lower-quality parenting skills during the first year in comparison with adults. For instance, Culp, Culp, Osofsky, and Osofsky (1991) found that adolescent mothers were less expressive, less positive, and provided fewer words to their 6-month-old infants during a feeding session than did older mothers. When children were one year of age, adolescent mothers continued to provide their children with fewer words than adult mothers. In addition, the quality of language to which children of teen mothers were exposed was less rich than what was experienced by children of older mothers. Specifically, teens spoke fewer words during moments of joint attention, labeled fewer objects, uttered more commands, and provided fewer positive affective words in comparison with adults (Culp, Osofsky, & O’Brien, 1996).

Adolescent mothers appear to continue to display less-optimal parenting behaviors past infancy and into the toddler period. In a study of 14-month-olds, teenage mothers were more intrusive, more detached, and less supportive of their children during play in comparison with older mothers, even after controlling for multiple demographic factors (Berlin et al., 2002). Similarly, in an observational study of 24-month-olds, young mothers were more restrictive and negative when interacting with their toddlers than were older mothers (Traumann-Villalba, Gerhold, Laucht, & Schmidt, 2004). Also during the toddler period, children of adolescent mothers often experience inadequate or inappropriate exposure to language. Lacroix, Pomerleau, and Malcuit (2002) found that adolescent mothers used more controlling and directive language and provided fewer
utterances with information or questions during interactions in comparison with adult mothers.

Although cross-sectional examinations of adolescent parenting have indicated that teen mothers often have deficits in parenting during the early years of their children’s lives (Berlin et al., 2002; Luster & Vandenbelt, 1999), there remains a need to longitudinally investigate parenting processes in this high risk group. Since multiple studies have demonstrated large variability in parenting behaviors among adolescents (e.g. Whiteside-Mansell et al., 1996), it is likely that for some teens, parenting quality improves over time, whereas for others it is stays the same or even decreases. These unique patterns of change may differentially impact language development. It is important, therefore, to investigate not only changes in parenting, but also the factors that influence individual differences in change and how these changes impact children.

The factors that affect parenting are potentially different for teens and adults due to the uniqueness associated with parenting during the adolescent period. Therefore, when examining how and why adolescent mothers exhibit changes their parenting behaviors, it is helpful to consider theories of adolescent development in addition to theories of parenting. The next section presents the Whitman et al. (2001) model of adolescent parenting as a theoretical framework for studying parenting processes in teens.

_A Model of Adolescent Parenting_

Parent-child interactions do not occur in a vacuum, but instead they operate in a complex ecology of larger social systems (Bronfenbrenner, 1977). Since individual, family, and community characteristics all act as sources of protection (Masten &
Garmezy, 1985), it is critical to consider factors which influence parenting quality in high-risk families and which also directly and indirectly affect children’s development. Whitman and colleagues (2001) presented a model of adolescent parenting that highlights ways in which issues particularly salient to parenting processes among teens impact both maternal and child functioning.

In developing their model of adolescent parenting, Whitman and colleagues (2001) drew upon Piaget’s (1972) theory of social and cognitive development, Erikson’s (1960) conceptualization of adolescent identity, and Belsky’s (1984) model of adult parenting. The Piagetian view of development emphasized adolescence as a period characterized by the emergence of complex problem-solving skills, idealistic thinking, and egocentrism. Adolescent parents, in turn, frequently have inappropriate attitudes, beliefs, and expectations about parenting. The Eriksonian perspective highlighted the importance of identity formation during adolescence. An off-time entry into parenthood adds complexity to normal identity confusion associated with adolescence, and teen parents, in turn, are at risk for either identity foreclosure (premature identity selection) or diffusion (failure to establish an identity). In either case, an adolescent mother’s struggle with identity will potentially distract from her parenting role, subsequently reducing her preparedness and increasing her stress (Whitman et al., 2001).

Belsky (1984) indicated three areas of influence on parenting: psychological adjustment (personality and developmental history), contextual-environmental supports (work, marital relationship, and social networks), and child characteristics (temperament and psychopathology). According to this framework, parenting is a dynamic construct shaped by multiple inter-related, and often, bi-directional factors. The Belsky (1984)
model is not entirely appropriate, however, for explaining variability in adolescent parenting behaviors (Whitman et al., 2001). For instance, adolescent mothers are frequently unemployed and unmarried (Howard, Borkowski, & The Centers for the Prevention of Child Neglect, 2006), indicating that work and marital relationships are probably less salient sources of support for teens than for adults. Furthermore, given the unique circumstances associated with becoming a parent at a young age, adolescent mothers are often unprepared for their new parenting role. Whitman et al. (2001) postulated this lack of readiness as a key contributor to the quality of an adolescent’s parenting.

With the perspectives of Piaget, Erikson, and Belsky as a foundation, Whitman and colleagues (2001) developed a model composed of five constructs which are particularly relevant for adolescents and conjointly determine parenting and subsequently child development: (1) maternal socioemotional adjustment, (2) social supports, (3) maternal learning ability, (4) maternal cognitive readiness, and (5) infant characteristics. Although there are multiple direct and indirect pathways among these variables, the primary pathways of interest for the present study are (a) from cognitive readiness to parenting to child development and (b) from social supports to parenting to child development. Also, according to this model, social supports have an indirect effect on parenting via cognitive readiness, such that mothers with more social supports are more prepared for parenting, and, in turn, demonstrate higher parenting quality (Whitman et al., 2001). The present study will investigate how cognitive readiness and social support from partners relate to changes in parenting during the first two years of life.
Cognitive readiness to parent. Cognitive readiness for parenting can be considered a combination of knowledge of child development and parenting style (Sommer et al., 1993). Being prepared for parenting has been linked with positive early parenting (O’Callaghan, Borkowski, Whitman, Maxwell, & Keogh, 1999), less parenting stress (Chang et al., 2004; Sommer et al., 1993), and better child outcomes (Miller, Miceli, Whitman, & Borkowski, 1996; Sommer et al., 2000). Similarly, knowledge of child development and unrestrictive concepts of child-rearing have been associated with higher quality home environments (Benasich & Brooks-Gunn, 1996). Although cognitive readiness has not been investigated as a predictor of changes in parenting over time, early preparedness is likely an important factor for understanding differences in parenting trajectories. For instance, mothers who are aware of their children’s developmental needs and who have positive attitudes about their new parenting roles may have the understanding and motivation necessary to provide their infants with additional opportunities for learning as their children grow.

Although adult mothers have been found to have higher cognitive readiness than adolescents, these differences in readiness are at least partially explained by demographic factors such as intelligence, SES, race, and education (Sommer et al., 1993). Furthermore, although cognitive readiness is typically considered an important predictor in models of adolescent parenting, it potentially is a salient factor in adult parenting, particularly for adults with low educational attainment. Adults with fewer educational experiences may have similarly inappropriate developmental expectations of child development, resulting in less-optimal parenting over time.
Social support. Another important hypothesized determinant of parenting among adolescents is social support. Social supports for teens arise from a variety of sources, such as grandmothers, romantic partners, friends, and larger family networks (Bunting & McAuley, 2004; Sommer et al., 2000; Voight, Hans, & Bernstein, 1996). For adolescent mothers, however, social support is often a “mixed bag,” with different sources providing unique forms of support, which may or may not be helpful to the mother (Bunting & McAuley, 2004; Voight et al., 1996). For instance, if a young mother has a turbulent relationship with a provider of support, that support may not serve to reduce her stress (Larson, 2004) or improve her parenting quality (Bunting & McAuley, 2004; Florsheim & Smith, 2005; Hess, Papas, & Black, 2002).

Maternal age also influences the type and amount of support that is helpful for adolescent mothers (Shapiro & Mangelsdorf, 1994). For instance, living with a grandmother has been associated with less-optimal parenting outcomes for older mothers, but with positive effects for very young mothers (Chase-Lansdale, Brooks-Gunn, & Zamsky, 1994). For young adolescent mothers, a three-generation household often provides a context for aid with caregiving and support for education; however, continuing in this living arrangement after the transition to adulthood frequently inhibits a young mother’s development of autonomy and have negative consequences for her child (Black et al., 2002). Furthermore, too much direct caregiving support from the infant’s grandmother may hinder a young mother from fully becoming involved in her new parenting role, which in turn, negatively influences the parent-child relationship (Easterbrooks, Chaudhuri, & Gestsdottir, 2005)
Social support from romantic partners, often the baby’s father, is one source of support that is increasingly receiving attention from researchers (Bunting & McAuley, 2004). Although adolescent mothers are less likely to marry their children’s fathers than adult mothers (Howard et al., 2006), romantic partners are still significant sources of support for teens. Partners often provide mothers with emotional and financial support and frequently help with childcare; these supports have been related to positive parenting among teens (Bunting & McAuley, 2004). For instance, in a study of first-time mothers and their 4-month-old infants, paternal support was related to better maternal parenting and higher quality home environments. These findings were similar for both adolescent and adult mothers across a wide range of socioeconomic backgrounds (Howard et al., 2006).

Although social support in general, and partner support in particular, have been related to higher parenting quality among adolescent mothers (Bunting & McAuley, 2004; Howard et al., 2006), little research has investigated how early support impacts young mothers’ parenting behaviors over time. Mothers who feel supported prior to their baby’s birth potentially will have more energy and less stress when preparing for their new parenting role. It is likely that appropriate social supports during pregnancy place a young mother “on the right track,” and have long-term effects on her ability to recognize her child’s needs and respond to them accordingly.

In conclusion, it is possible that social support from partners and cognitive readiness to parent act as predictors of not just parenting at one time point, but also changes in parenting over time. Furthermore, cognitive readiness and partner support are likely contributing factors in early parenting behavior for not only adolescent mothers but
also adult mothers. Consistent with a developmental psychopathology perspective, studying development in a non-normative context, such as adolescent parenting, is informative for theories of normative developmental processes (Cummings et al., 2000). As such, the present study evaluated cognitive readiness and partner support as factors related to parenting quality over time for both adolescents and adults.

Summing Up

Research across a broad range of families has demonstrated the importance of exposure to rich learning environments and warm, responsive parent-child interactions for children’s language development (Borkowski et al., 2002). Some mothers, however, have difficulty providing supportive and enriching early experiences for their children, often due to their young age, low educational attainment, or stresses associated with poverty (Coley & Chase-Lansdale, 1998). Although previous work has demonstrated which components of parenting are related to language development problems in young children, gaps still remain in the literature, particularly pertaining to how parenting changes over time and how these changes influence the emergence of language competencies. More specifically, previous studies of adolescent parenting have three primary weaknesses: (1) they do not compare adolescent mothers to appropriately matched adult samples, (2) they do not examine trajectories of parenting, and (3) they fail to explore factors associated with positive parenting over time.

Research with adolescent mothers has generally compared the parenting practices of teens to the behaviors of middle-class adults (Berlin et al., 2002). Many adolescent parents, however, have additional risk factors such as low-educational attainment,
poverty, and single-parenthood, which potentially may be more influential on children’s outcomes than adolescent parenting (Coley & Chase-Landsdale, 1998; Maynard, 1997). It is important for studies comparing adolescent and adult parenting to have samples carefully matched on background variables so that it is possible to more accurately ascertain the way in which age at childbirth, independent of education or poverty, translates into risk for children’s development.

Studies of adolescent parenting have often utilized correlational analyses and failed to assess causal processes related to the quality of parenting practices. In some cases, researchers have examined parenting behaviors at multiple time points, but not analyzed for longitudinal changes in parenting (e.g. Luster & Vandenbelt, 1999). As such, little is known about the nature of change in early parenting practices and how parenting processes may be unique or similar for adolescents and adults. Since adolescent mothers are still maturing as their children develop, measuring parenting longitudinally, instead of just as a “snapshot” of behaviors, may be particularly critical for understanding the mechanisms through which teen parents contribute to their children’s language development.

Finally, there is relatively little research examining how maternal characteristics and environmental factors may influence patterns of parenting behaviors. Just as the accumulation of multiple risks for developmental problems has been postulated as a unique aspect of poverty (Evans, 2004), adolescent parenthood can likewise be characterized as a problem of cumulative risks, with numerous factors operating as sources of risk for children (Farris, Weed, & Smith, in press). There is a need to examine the longitudinal and cumulative influence of personal, family, and community factors on
parenting and child development (Carothers, Farris, & Maxwell, in press). By understanding how specific factors impact changes in parenting behaviors, future research can inform interventions, especially concerning when and how to intervene to prevent early appearing language delays.

Present Study

The theoretical model for the present study, based on the parenting models of Whitman et al. (2001) and Belsky (1984), is presented in Figure 1. According to this model, parenting is a dynamic process that changes over time and subsequently influences children’s language development. The present study tested the proposed model by evaluating the degree to which parenting changes over time, by predicting parenting trajectories from prenatal factors (cognitive readiness and support from partner) and, finally, by relating initial quality of parenting and changes in parenting to children’s language development. Differences in the mean levels of each construct and the strength of association among constructs were examined for adolescents and adults.

Data for the present study came from the Parenting for the First Time Project, a multi-site, longitudinal study following first-time mothers and their children from the prenatal period through their children’s third year of life. Parenting was measured when children were 4, 8, and 18 months of age using the Infant-Toddler Home Observation for the Measurement of the Environment (IT-HOME; Caldwell & Bradley, 2001). The IT-HOME measures components of parenting including maternal warmth, lack of hostility, and support for language and literacy. Standardized tests of children’s language development were administered at 24 months. Maternal cognitive readiness to parent and
social support from partners were collected using self-report measures during the third trimester of pregnancy and will be utilized as predictors of parenting quality. The present evaluation evaluated not only how parenting changes over time, but also how prenatal cognitive readiness and social support influence parenting trajectories. Linkages between parenting (both at 4 months and over time) and language development at 24 months were also examined.

*Changes in parenting over time.* Consistent with previous research, (Whitman et al., 2001), it was hypothesized that adults would have higher levels of initial positive
parenting behaviors than teens and would show increased parenting quality over time. Mothers with positive parenting trajectories would be in a better position to recognize their children’s developmental needs and subsequently provide more opportunities for language-learning as their infants mature.

In terms of change over time, it is plausible that some teens remain stable in their parenting behaviors, whereas others display increases or decreases in positive parenting (Whiteside-Mansell et al., 1996). For instance, some teens may improve the quality of their parenting over the first two years of their children’s development by adapting to their new parenting role and maturing into adulthood. Conversely, the dual stresses of transitioning to adulthood and raising children may present unique, difficult challenges for teens, resulting in consistently inappropriate parenting behaviors over time. Teens may also display decreases in positive parenting, if they turn over some of their parenting responsibilities to other family members as the stresses associated with childrearing become overwhelming.

Predictors of change. Cognitive readiness to parent and social support from romantic partners were considered as predictors of changes in parenting over time. Mothers who are cognitively prepared for parenting and who receive early support from their partners have the emotional and cognitive resources necessary to adapt their parenting behaviors as their infants mature and provide their children with the stimulation necessary for language learning over time. Specifically, cognitive readiness to parent should predict parenting at 4 months as well as changes in parenting from 4 to 18 months for all three groups. Mothers with accurate knowledge of child development and less-restrictive attitudes about childrearing were expected to display positive parenting at 4
months (Benasich & Brooks-Gunn, 1996; O’Callaghan et al., 1999). Consistent with previous research (Sommer et al., 1993), adults were anticipated to have the higher levels of cognitive readiness than teens and to show increases in parenting quality over time.

Since previous theories of parenting have identified social support as important for parenting among adults (Belsky, 1984) as well as teens (Whitman et al., 2001), paternal support was hypothesized to predict initial positive parenting and parenting trajectories for all groups. Mothers who perceived their partners as supportive were expected to display more-optimal initial parenting behaviors and show improvements in parenting over time. Although paternal support was theorized to be a significant predictor of parenting within each group, differences in levels of support are anticipated. Since adults in this sample were more likely to be married than teens (Howard et al., 2006), adult mothers were expected to have higher levels of paternal support.

*Parenting and children’s language.* Consistent with existing research with adolescents and adults samples, parenting was anticipated to predict language development similarly for teens and adults (Dieterich et al., 2006; Luster & Vandenbelt, 1999). Specifically, higher-quality parenting at 4 months as well as improvements in parenting over time were considered to be related to children’s language scores at 24 months. Furthermore, given the strong connection between maternal educational attainment and children’s cognitive-linguistic development (Gottfried, Gottfried, Bathurst, Guerin, & Parramore, 2003), children of adult mothers were predicted to have the best auditory comprehension and expressive communication skills.

The present study adds to the extant literature on early parenting and language development in multiple ways. First, by assessing parenting as a latent construct that
changes over time, the current project addressed questions regarding how dynamic trends in parenting, and not just parenting behaviors at a single time, influenced language development. Next, by including both adult and adolescents in the analyses, it was possible to examine how adolescents and adults may parent in similar, or uniquely different, ways over time. Finally, the present study was informative for interventions concerning how early factors (prenatal cognitive readiness and partner support) may have long-term consequences for both mothers’ parenting and children’s language development.
METHOD

Participants

Participants included 682 mother-infant dyads from the Parenting for the First Time Project, a multi-site longitudinal study following primiparous mothers and children from the prenatal period through the third year of life in South Bend, IN, Washington, D.C., Kansas City, KS, and Birmingham, AL. Mothers were recruited from hospitals, health clinics, social service agencies, and school-aged mothers programs. The sample consisted of 396 adolescent mothers and 286 adult mothers with a wide range of educational backgrounds. Mothers ranged in age from 15 to 35 years (mean age = 20.73) and were racially diverse: Sixty-four percent African-American, 18% Caucasian, 15% Latina, and 3% Multiracial/multiethnic or other. Approximately 50% of mothers reported annual incomes of $15,000 or less, 25% reported between $15,000 and $30,000, and 25% reported over $30,000. On average the adolescent group had a mean education level of 10\textsuperscript{th} grade. The adult group had a wide range of educational backgrounds: 17% had not finished high school, 26% had a high school diploma, 18% had at least one semester of vocational school or college, and 39% had college degrees or higher. Participants with missing data did not differ from mothers with complete data on key demographic variables: education level, $F(1, 406) = 1.45, p > .05$; income, $F(1, 319) = 0.22, p > .05$; and ethnicity, $F(1, 680) = 0.50, p > .05$. 

Design and Procedure

The present study utilized data gathered from mothers during the third trimester of their pregnancies as well as data collected when children were 4, 8, 18, and 24 months of age. Measures of constructs from each time point (cognitive readiness to parent, support from partner, parenting, and language development) are presented in Table 1. Indicators of cognitive readiness to parent and support from partner were drawn from the prenatal interview. In most cases during this interview, mothers came to the university setting and reported on measures of parenting style and attitudes, knowledge of child development, and social support. The interview typically lasted two hours; transportation was provided for participants when requested. If a mother was unable to come to the university setting, the assessment occurred in her home.

When children were 4, 8, and 18 months, mothers were interviewed in their homes on a variety of topics over approximately a two-hour period. At each interview, basic demographic information was collected in addition to measures of social and community support, daily activities with the child, and father involvement. The home visits also included a semi-structured interview, the Infant-Toddler Home Observation for the Measurement of the Environment (IT-HOME; Caldwell & Bradley, 2001). Indicators of the quality of parenting, including warmth, support for learning and literacy, and lack of hostility were drawn from the IT-HOME.

The final assessment took place in either the university setting or in families’ homes when children were 24 months of age. Mothers responded to questions regarding daily living, family routines, and their children’s physical and emotional health. Also at this time, indicators of language development (auditory comprehension and expressive
communication) were collected using the Preschool Language Scale, 4th Edition (PLS-4; Zimmerman, Steiner, & Pond, 2002). At every interview, families were compensated for their participation with Wal-Mart gift cards. Participants were also contacted via telephone between interviews to maintain rapport and reduce attrition.

### TABLE 1

ASSESSMENTS COLLECTED PRENATALLY AND AT 4, 8, 18, AND 24 MONTHS

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Note: PSI = Parenting Style Inventory; KIDI = Knowledge of Infant Development; IT-HOME = Infant-Toddler Home Observation for the Measurement of the Environment; PLS-4 = Preschool Language Scale-4
Prenatal Measures

Cognitive readiness to parent. Mothers’ cognitive readiness to parent was assessed during the prenatal assessment using the Knowledge of Infant Development Instrument (KIDI) and the Parenting Styles and Expectations Questionnaire (PSE). The KIDI was originally developed by MacPhee (1981) and consists of 14 self-reported items designed to assess knowledge of infant development. Each item is on a 5-point likert scale ranging from strongly disagree to strongly agree. Sample questions include, “All infants need the same amount of sleep,” “A good way to train children not to hit is to hit them,” and “One-year-olds often cooperate and share when they play together.” The measure has a test-retest reliability of .92 and internal consistency of .82.

The PSE consists of 32 items from the Adult-Adolescent Parenting Inventory (Bavolek, 1984), relating to parenting practices, discipline, and appropriateness of child interactions. For each item mothers reported whether they agreed or disagreed on a scale of 1 to 5. Sample items included: “Parents will spoil their children by picking them up and comforting them when they cry,” “Parents who encourage communication with their children only end up listening to complaints,” and “Children should always ‘pay the price’ for misbehaving.” This test had a test-retest reliability of .87 and an internal consistency of .89. The KIDI and PSE were z-scored and summed to create a total cognitive readiness score, with higher scores indicating more readiness for parenting.

Social Support from Father. Social support from fathers was assessed utilizing 7 items drawn from the Life History Interview, an informal interview developed for the Parenting for the First Time study. For each item mothers indicated with a yes or no response whether or not they expected fathers to provide support following the birth of
their baby. Types of support included: financial, diapers, childcare, transportation, family involvement, visits, and other. The dichotomous responses for each item were summed, creating a possible range of scores from 0 to 7, with higher scores indicating greater levels of expected support from fathers.

**Measures of Parenting**

Parenting was assessed utilizing select items from the IT-HOME (Caldwell & Bradley, 2001). When children were 4, 8, and 18 months of age, the IT-HOME was administered in a semi-structured format by trained interviewers in participants’ homes. The IT-HOME has well-established psychometric properties and numerous studies have used it as a measure of emotional support and cognitive stimulation in the home environment for children from birth through 36 months (Bradley, Mundfrom, Whiteside, Casey, & Barrett, 1994; Whiteside-Mansell et al., 1996; Thompson et al., 1998). For the present study, interviewers where instructed by a master trainer to achieve an inter-rater reliability of .90. As part of the assessment, interviewers either directly observed or informally queried mothers about each item and then rated the item as “0” for absent or “1” for present.

Three conceptually-derived subscales salient to language development will be used in the present study: Parental Warmth, Support of Learning and Literacy, and Lack of Hostility. The items that form each of the subscales are presented in the Appendix. Adequate reliability and predictive validity for these subscales have been demonstrated in national samples (Fuligni et al., 2004; Linver, Martin, & Brooks-Gunn, 2004).
Parental Warmth. The Parental Warmth subscale consists of seven items related to maternal warmth and affection directly observed during the home visit. Example items include, “Parent's voice conveys positive feeling about the child” and “Parent caresses or kisses child at least once during the visit.” In the present sample, the Parental Warmth subscale had internal consistency reliabilities of .68, .66, and .69 at 4, 8, and 18 months of age, respectively. These reliabilities are similar to the alphas reported in large, national data sets for children in this age range (Linver et al., 2004).

Support of Learning and Literacy. The original constellation of items suggested by Linver et al. (2004) for the Support of Learning and Literacy subscale had 12 items; however, five of these items were not used in the present study because they were not equally appropriate for each time point. For example, the item, “Child has a stroller, kiddie-car, scooter, or tricycle” was excluded. Subsequently in the present study the subscale consisted of 8 observer-rated and self-reported items. Sample items include, “Child has toys for literature and music,” and “Parent talks to child while doing housework.” Internal consistencies in the current sample were .74, .74, and .72 at 4, 8, and 18 months, respectively.

Lack of Hostility. The Lack of Hostility subscale consists of five observer-rated items. Sample items include, “Parent does not shout at child during the visit” and “Parent does not express overt annoyance with or hostility to the child.” Internal consistency coefficients were higher (.99 at each time point) than those reported in national data sets (Fuligni et al., 2004; Linver et al., 2004).
**Measures of Child Language Development**

*Preschool Language Scale-4 (PLS-4).* The PLS-4 is standardized for use with children between birth to 7 years of age and takes between 20 and 30 minutes to administer (Zimmerman et al., 2002). The PLS-4 provides standard scores and language age equivalents for auditory comprehension and expressive communication as well as a total language score. The internal consistency for 1-5 year olds ranges from .72 to .97. The test-retest stability in the relevant developmental periods ranges from .82 to .97. The PLS-4 is an appropriate tool for diagnosing language delay (Zimmerman & Castilleja, 2005), and was given when children are 24 months of age. Standardized total scores of auditory comprehension and expressive communication will be reported for the sample, but raw total scores will be utilized in growth curve analyses.
RESULTS

The present study utilized latent growth curve (LGC) modeling to examine parenting over time in a diverse sample of adolescent and adult first-time mothers. Specifically, four latent growth curve models were evaluated, with cognitive readiness and paternal support acting as predictors of initial positive parenting as well as change in parenting over time: A second-order growth model of parenting, a growth model of warmth, a growth model of lack of hostility, and a growth model of support for learning and literacy. Measurement invariance over time and across groups was also examined. Parenting was subsequently related to children’s language development.

Descriptive Information

The means, standard deviations, and ranges for adolescents and adults on measures of partner support, cognitive readiness, parenting, and language skills are presented in Table 2. Intercorrelations among all variables are presented in Table 3.

Indicators of parenting. Indicators of parenting (warmth, lack of hostility, and support for learning and literacy) were collected when children were 4, 8, and 18 months of age. When examining the mean values of warmth, lack of hostility, and support for learning and literacy, adolescents generally had lower scores at each time point than adults. From 4 to 18 months adolescent mothers had average warmth scores ranging from 5.3 to 5.4 out of a possible range of 0 to 7, whereas adults had scores ranging from 6.1 to 6.3. The lack of hostility measure had a possible range of 0 to 5 and teens had average
TABLE 2
DESCRIPTIVE INFORMATION FOR PREDICTOR, PARENTING, AND LANGUAGE VARIABLES FOR ADOLESCENTS AND ADULTS

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# TABLE 3

**INTERCORRELATIONS AMONG VARIABLES FOR ADOLESCENTS AND ADULTS**

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

scores ranging from 3.7 to 4.8 over time and adults had scores from 4.0 to 4.9. Scores on support for learning and literacy had a possible range of 0 to 8; and average scores over time ranged from 4.9 to 5.7 for teens and 5.8 to 6.5 for adults. Indicators were significantly correlated at each time point (ranging from \( r = .20-.49, p’s < .01 \)) as well as across time (ranging from \( r = .13-.60, p’s < .05 \)).

**Children’s language skills.** Measures of children’s expressive communication and auditory comprehension were collected when they were 24 months of age. In comparison with national norms (\( M=100, SD=15 \)), children in both groups demonstrated below average scores on measures of expressive and auditory language skills. There was a significant difference between adolescent and adult groups for expressive language, \( F(1, 261) = 9.7, p < .01 \), and a marginally significant difference between groups for auditory language, \( F(1, 254) = 2.9, p < .10 \). Children of teens had lower average expressive language scores (\( M=91.6, SD=13.2 \)) than children of adults (\( M=96.4, SD=12.1 \)) and were similarly lower on auditory language (\( M=90.3, SD=14.9 \)) than were children of adults mothers (\( M=94.2, SD=15.0 \)). Furthermore, 43% of children of teens scored at least one standard deviation below the normative mean on auditory comprehension, in comparison with 29% of adults. Similarly, 23% of children of teens were a standard deviation below the mean on expressive comprehension in contrast with 12% of children of adults.

**Prenatal predictors: Paternal support and cognitive readiness.** During the third trimester of pregnancy, mothers reported on the instrumental support they anticipated receiving from their children’s fathers after the birth of their babies. In general, mothers expressed high expectations of support in the form of financial assistance, diapers, childcare, transportation, visits, and help from extended family. For instance, 83% of
teens and 87% of adults indicated that they expected fathers to provide at least some financial support. Similarly, 70% of teens and 79% of adult mothers expected fathers to help with childcare on a regular basis. Adolescents and adults were not significantly different in their expectations of support, $F(1, 680) = 1.84, p > .05$. There was a significant difference between teens and adults in their cognitive readiness, $F(1, 658) = 67.1, p < .001$, with adults being more cognitively prepared for parenting ($M = .06, SD = 1.8$) than adolescents ($M = -0.5, SD = 1.6$).

**Overview of Latent Growth Curve Modeling**

The present study utilized LGC modeling to investigate changes in parenting quality over the first 18 months of life. Prenatal cognitive readiness to parent and social support from fathers were evaluated as predictors of initial parenting quality and changes in parenting over time. The influence of parenting trajectories on children’s language abilities at 24 months was also examined. In all analyses, differences between adolescents and adults were tested.

LGC modeling is an approach that integrates individual growth modeling (i.e. hierarchical linear modeling) and structural equation modeling (SEM; Willet & Sayer, 1994). This method is well-suited for answering questions about how a process changes over time. LGC modeling provides estimates of mean structure (mean initial level and mean growth), reflecting the average starting point for all individuals (intercept) and the average rate of change (slope). Estimates of covariance structure are also given, indicating the degree of variability around the intercepts and slopes (Bollen & Curran, 2006).
Because LGC utilizes structural equation modeling techniques, the intercept and slope of a construct can be related to variables of interest, such as exogenous predictors, outcomes, or covariates (Duncan, Duncan, Strycker, Li, & Alpert, 1999). Other benefits of growth curve analysis in an SEM framework include the ability to evaluate overall fit of measurement and structural components, to account for measurement error, and to address missing data. Most SEM software packages have an option for Full Information Maximum Likelihood (FIML) estimation, which computes the likelihood function for each case utilizing all data available for that case (Bollen & Curran, 2006).

Evaluating model fit. Models were evaluated in terms of measures of goodness of fit, parameter estimates and standard errors using the Mplus modeling program (Muthen & Muthen, 2001). Modification indices were also examined. Generally, a satisfactory fit is indicated by a comparative fit index (CFI) close to one (Bentler, 1990) and a root mean square error of approximation (RMSEA) less than or equal to .08 (MacCallum, Browne, & Sugawara, 1996). Non-significant chi-square values typically are needed in order to achieve an acceptable fit. Significant parameter estimates and small standard errors likewise indicate good fit. When considering modification indices, only modifications that are theoretically justified and result in a significant increase in the chi-square value should be included in subsequent model tests. For the present study, modification indices were set such that variations in the model were suggested only when they would lead to an increase in the chi-square value by 5 or more.

Group differences were evaluated using the likelihood ratio test following the steps outlined by Bollen and Curran (2006). According to this method, a series of models are compared, each with an increasing number of restrictions, moving from a model
where all means, variances, and error variances are different across groups to a final model where these values are constrained to be the same for each group. This hierarchy of model testing creates a family of nested models, such that one model is a restricted version of the previous model and these models can be compared using the difference in chi-squares and their degrees of freedom. If the chi-square difference is significant, then the restriction is inappropriate and the groups differ on the particular parameter being tested (Bollen & Curran, 2006).

**Measurement model.** Before examining the LGC models, a measurement model was evaluated for the parenting construct. As mentioned, the parenting construct at 4, 8, and 18 months had three indicators drawn from the IT-HOME: warmth (WM), support for learning and literacy (SLL), and lack of hostility (LH). Several fit indices were utilized to determine the goodness of fit of the measurement model and all subsequent models: Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and $\chi^2$. In testing the measurement model all latent factors (4 month parenting, 8 month parenting, and 18 month parenting) were allowed to covary. Error variances of indicators were also allowed to correlate with each other over time. The measurement model provided a good fit for the data: $\chi^2 (15, N = 553) = 35.9, p > .05$, RMSEA = .05, CFI = .97. Furthermore, all indicators loaded significantly on the latent constructs with small standard errors. Once the appropriateness of the measurement model was established, tests were conducted to evaluate for measurement invariance over time and across groups.
Measurement Invariance

Chan (1998) suggested a two phase approach when analyzing change over time, involving first testing for measurement invariance across time and across groups, and then examining the latent growth curves. It is important to establish measurement invariance of a construct so that differences between groups can be interpreted as true differences in the same underlying factor and not just differential bias in item responses. Similarly, testing for measurement invariance over time is critical so that observed growth can be interpreted as true change in the underlying construct and not as change in what the items mean over time (Curran & Willoughby, 2003). In order for measurement invariance to hold, the intercepts, factor loadings, and residual variances must be the same across groups and over time.

Invariance over time. The first step in evaluating measurement invariance was to test an unrestricted model where all factor loadings, intercepts, and residual variances for each time point were estimated separately and the factor means were zero. In this model (Model 1), the three parenting factors reflected three time points (4, 8, and 18 months) and each parenting factor was indicated by three manifest variables (warmth, support for learning and literacy, and lack of hostility). This model had good fit, \( \chi^2 (2, N = 1253) = 2.9, p > .05; \) RMSEA = .03; CFI = 1.0.

After evaluating the unrestricted model, the next step was to test a model for invariance of the factor loadings. In this model the intercepts were freely estimated across time, the factor means were zero at each time point, and the factor loadings were restricted to be the same over time. Since this model was a restricted version of Model 1 and part of a series of nested models, the difference in chi square was used to determine
the appropriateness of the model with equal factor loadings. The restricted model had a significantly worse fit than the unrestricted model ($\chi^2 (4, N = 1253) = 11.7, p < .05$). Modification indices suggested allowing the factor loading for hostility to be estimated separately at 4 months. After making this alteration, the restricted model (Model 2) was not significantly different from Model 1 ($\chi^2 (3, N = 1253) = 1.0, p > .05$). The inclusion of the freely estimated factor loading for lack of hostility at 4 months indicated a violation of invariance of factor loadings.

The next step was to test the invariance of the intercepts. In this model, the factor mean at 4 months was set to 1 and the factor means at 8 months and 18 months were estimated. The factor loadings as well as the intercepts were set to be the same across time. Using the difference in chi square, this model had a significantly worse fit than Model 1, $\chi^2 (5, N = 1253) = 112.5, p < .05$, with several modification indices suggested for chi square values greater than 10. The suggestion to free the lack of hostility intercept at 18 months had the highest chi square value. Thus, the model was adjusted so that the hostility intercept was estimated separately at 18 months, and this model was still significantly worse than Model 1, $\chi^2 (4, N = 1253) = 65.0, p < .05$. The modification indices next suggested freeing the intercept parameter for support for learning and literacy at 4 months. After making this change, the model remained significantly worse than Model 1, $\chi^2 (3, N = 1253) = 19.2, p < .05$. Modification indices suggested allowing the intercept for lack of hostility to be estimated separately at 4 months. After making that alteration for the lack of hostility variable, the model was not significantly different from Model 1, $\chi^2 (2, N = 1253) = 0.4, p > .05$, and no modification indices were suggested, indicating that this model (Model 3) could be accepted. Thus, the model
displayed a violation of measurement invariance of the intercepts, with the hostility intercepts being different at each time point and with the support for learning and literacy intercept being different at 4 months than at 8 and 18 months.

The third step for testing measurement invariance was to evaluate the invariance of the residual variances. For this model, all intercepts that were freed in Model 2 (hostility at 4 and 18 months and support for learning and literacy at 4 months), as well as the factor loading that was freed in Model 1 (hostility at 4 months), were left unrestricted. Additionally, the residual variances were set to be equal across time. This model had a significantly worse fit than Model 1, $\chi^2 (8, N = 1253) = 67.7, p < .05$. Several modifications were suggested for the residual variances. Specifically, allowing the residual variance of the hostility variable to be free at 18 months had the highest chi square value. After freeing this parameter the model slightly improved, but was still significantly worse than Model 1, $\chi^2 (7, N = 1253) = 54.6, p < .05$. It was also suggested that the residual variance of lack of hostility should be freed at 8 months. After this modification, however, the model still had a worse fit than Model 1, $\chi^2 (6, N = 1253) = 16.5, p < .05$. Modification indices next suggested freeing the residual variance of support for learning and literacy at 18 months. This resulted in a model (Model 4) that was not significantly different from Model 1, $\chi^2 (5, N = 1253) = 3.1, p > .05$, and no other modifications were suggested. Thus, the residual variances were different for hostility at each time point and the residual variance for support for learning and literacy was different at 8 months than at 4 and 18 months. This indicates a violation of measurement invariance in the residual variances.
Invariance over time with covariates. Next, three covariates (education level, income, and ethnicity) were added to the aforementioned models to determine if these factors might explain the violations of measurement invariance. Covariates were added in model testing for invariance of factor loadings, intercepts, and residual variances. After evaluating these models, a few violations of measurement invariance still persisted. Specifically, there was evidence for invariance of the factor loadings, but not for the intercepts and residual variances. The intercepts for lack of hostility were freed to be estimated separately at each time point. The residual variances for lack of hostility were also independently estimated at 4, 8, and 18 months and the residual variance for support for learning and literacy was calculated separately at 18 months. The final model with covariates and freed parameters (lack of hostility intercepts, lack of hostility residual variances, and support for learning and literacy residual variance at 18 months) displayed a good fit, $\chi^2 (7, N = 2046) = 5.99; \text{RMSEA} = .000; \text{CFI} = 1.00$, and no additional modifications were suggested. Ethnicity was not a significant covariate. Thus, after incorporating covariates into the model, there still remained violations of measurement invariance at the level of the intercepts and the residual variances.

In conclusion, the parenting construct was only partially measurement invariant across time. Specifically, there was evidence for measurement invariance of factor loadings, but not for the factor means and residual variances. As Chan (1998) has noted, however, it is highly unlikely that applied data will meet such stringent standards for invariance; subsequently invariance of factor loadings is an appropriate gauge for invariance in real data. For the present study the presence of invariance of factor loadings was deemed sufficient evidence for invariance of parenting over time.
Invariance across groups. Next, after establishing measurement invariance over time, measurement invariance across groups (adolescents and adults) was also tested. First, an unrestricted model of 3 factors (4 month parenting, 8 month parenting, and 18 month parenting) with 3 indicators each (warmth, support for learning and literacy, and lack of hostility) was tested wherein factor loadings, intercepts, and residual variances were allowed to be estimated separately for each group. In this model correlations of error variances were allowed for each measure with itself over time. The unrestricted model (Model A) displayed a good fit, $\chi^2 (30, N = 553) = 45.6, p > .05; \text{RMSEA} = .04; \text{CFI} = .97$.

To test the invariance of the factor loadings across groups, a restricted model was tested with the factor loadings set to be equal for adolescents and adults. According to the likelihood ratio test, this model was not significantly different than the unrestricted model (Model A), $\chi^2 (6, N = 553) = 12.8, p > .05$, and was accepted because it was a more parsimonious model. This restricted model provided evidence for invariance of factor loadings for adolescents and adults. Next, invariance of intercepts was tested in a model that restricted the intercepts to be the same in both groups. This model did not significantly differ from Model A, $\chi^2 (12, N = 553) = 21.3, p > .05$, indicating invariance of intercepts across groups. Finally, invariance of residual variances was examined. For this model, residual variances were constrained to be the equal for adolescents and adults and the fit was significantly worse than Model A, $\chi^2 (51, N = 553) = 105.2, p < .05$. The modification indices suggested allowing the residual variance of warmth at 18 months to be estimated differently for teens than for adults. After this adjustment, however, the model still displayed a worse fit than Model A, $\chi^2 (50, N = 553) = 92.8, p < .05$. An
additional modification was suggested for allowing the error variances to correlate for hostility at 18 months and support for learning and literacy at 18 months in adults. With the addition of this correlation, the model was not significantly different than Model A, \( \chi^2 (19, N = 553) = 30.8, p > .05 \). No other modifications were suggested. Thus, the model displayed invariance in factor loadings and intercepts and partial invariance of residual variances. After establishing measurement invariance across groups, it was then appropriate to proceed to compare adolescents and adults utilizing multi-group models.

_Growth Curve Models_

Four latent growth curve models were examined to understand how parenting changed from 4 to 18 months. Cognitive readiness and paternal support were evaluated as predictors of initial positive parenting (intercept) and changes in parenting over time (slope). Intercept and slope were assessed as predictors of children’s expressive language and auditory communication skills. Additionally, each model was tested as a multi-group model so that differences between adolescents and adults in factors means, variances, and parameters estimates could be tested. The first step in examining multi-group models was to begin with a model where teens and adults were allowed to have independent estimates of factor means, variances, and path coefficients. In all models error variances were allowed to be different across groups. A series of nested models was then tested with an increasing number of restrictions such that parameters were constrained to be the same for both groups. Significant differences in fit between models indicated difference between groups on the parameter of interest.
The first model tested was a second-order growth curve model of parenting over time. For this model, the three manifest variables (warmth, support for learning and literacy, and lack of hostility) were used as individual indicators of parenting at 4, 8, and 18 months (first-order factors). In turn, these three latent parenting factors were used as indicators of latent intercept and slope (second-order factors). Since measures of parenting were available for just three time points, it was only possible to test for a linear trend. To indicate the linear trend, factor loadings for the slope factor were fixed to 0, 1, and 3.5, reflecting the passage of time between 4, 8, and 18 months. All loadings for the intercept factor were set to one. Error variances for each indicator were allowed to correlate across time. Although this model displayed adequate fit (RMSEA=.05, CFI=.96), it was an unacceptable model due to the presence of negative variance on more than one indicator. Even after including covariates and predictors, the model revealed poor fit (RMSEA=.05, CFI=.88) with negative residual variances, indicating that the second-order model of parenting over time was not a good fit for the data.

Unconditional growth curve models of warmth. Next, a growth curve model was examined for the warmth factor over time. For this growth model, the latent intercept and slope were indicated by warmth at 4, 8, and 18 months. As with the previous growth model, the factor loadings for the intercept factor were all set to 1 and the slope factor was fixed to 0, 1, and 3.5, to reflect the linear trend. Error variances were not allowed to correlate. A series of nested models were compared to determine which parameters (intercepts, variances, and path coefficients) in the growth model of warmth were different for teens and adults. The first step in the multi-group analysis was to test an unrestricted model wherein the means and variances of the intercept and slope were free
to vary across groups. Error variances were similarly allowed to be estimated separately in each group. No covariates, predictors, or outcomes were included in this preliminary, unconditional growth model. This model displayed good fit, $\chi^2 (2, N = 553) = .539, p > .05$; RMSEA = .000; CFI = 1.0.

The next model was a restricted version of the original unconditional growth model, with the intercept means being constrained to be equal for teens and adults. According to the likelihood ratio test, this model had a significantly worse fit than the unrestricted model, $\chi^2 (1, N = 553) = 789.7, p < .05$, indicating that teens and adults should be allowed to have different intercepts. Similarly, another restricted model was evaluated in which the mean slope was set to be the same across groups. This model was not significantly different from the unrestricted model, $\chi^2 (1, N = 553) = .7, p > .05$, signifying that it was appropriate to keep the slope means the same for both groups. In sum, these models indicated that adults had higher levels of warmth at 4 months than teens, but that adults and teens changed in the same way over time.

After examining differences in the means of the intercept and slope parameters for teens and adults, the variability around these parameters was examined for both groups. Specifically, a model was tested in which the intercept variances were restricted to be equal for teens and adults. This model was not significantly different from the unrestricted model, $\chi^2 (2, N = 553) = 4.5, p > .05$, indicating that it was appropriate to keep the variance of the intercept constrained to be the same in both groups. An even more restricted model was evaluated which set the variance of the slope to be equal across groups as well. This model was not significantly different from the restricted model, $\chi^2 (3, N = 553) = 4.7, p > .05$. Thus, although adolescents and adults displayed
differences in the intercepts of warmth, they displayed equality in terms of rates of change and variability around the intercept and slope.

Next, another family of nested models was compared for the conditional growth curve model of warmth. In these conditional models, cognitive readiness and instrumental support were added as predictors of intercept and slope. Intercept and slope, in turn, were predictors of auditory comprehension and expressive language. Also, two covariates, education and income, were added to this model as predictors of intercept and slope. Ethnicity was not included because it was not a significant covariate in any of the prior analyses. The fit indices and chi square differences for each comparative model are presented in Table 4. In these models, the intercepts were estimated separately for teens and adults, but the (a) slope means and (b) variances for the intercept and slope were constrained to be equal.

Conditional growth curve model of warmth. As with previous nested model comparisons, the first step in examining group differences in the conditional growth model of warmth was to test an unrestricted model where path coefficients were free to vary across groups. This model (W1) fit well (RMSEA = .03; CFI = .98). Next, a model (W2) was examined where the path from education to the intercept was restricted to be the same for teens and adults; according to the likelihood ratio test, this model was not significantly different from W1, $\chi^2 (1, N = 682) = 2.56, p > .05$. A similar model (W3) was tested with the path from education to the slope being equal across groups. This model likewise was not significantly different from W1, $\chi^2 (2, N = 682) = 2.62, p > .05$. Thus, the covariate education was operating similarly for teens and adults in predicting the initial level of warmth at 4 months and rate of change in warmth over time. After
TABLE 4

MODEL FIT INDICES AND NESTED MODEL COMPARISONS IN CONDITIONAL GROWTH CURVE ANALYSES OF WARMTH

<table>
<thead>
<tr>
<th>Model Specification</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Model Comparison</th>
<th>$\Delta \chi^2$</th>
<th>$\Delta$ df</th>
<th>CFI</th>
<th>RMSEA</th>
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<td>W1 vs. W2</td>
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<td>.97</td>
<td>.03</td>
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<td>Constrained education $\rightarrow$ intercept</td>
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<td>W1 vs. W3</td>
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<td>.98</td>
<td>.03</td>
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<td>W1 vs. W4</td>
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<td>.97</td>
<td>.03</td>
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<td>.03</td>
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<td>.97</td>
<td>.03</td>
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<td>W1 vs. W8</td>
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<td>.97</td>
<td>.03</td>
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<td>Added constraint: cognitive readiness $\rightarrow$ intercept</td>
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<td>Added constraint: cognitive readiness $\rightarrow$ slope</td>
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<td><strong>Model W10</strong></td>
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<tr>
<td><strong>Model W11</strong></td>
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<td>W1 vs. W11</td>
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<td>W1 vs. W12</td>
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<td><strong>Model W13</strong></td>
<td>56.31</td>
<td>47</td>
<td>W1 vs. W13</td>
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<td>.97</td>
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<td>Added constraint: slope $\rightarrow$ expressive</td>
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*Note. N = 682. Model W13 was accepted as the most adequate model. CFI = Comparative Fit Index and RMSEA = Root Mean Square Error of Approximation.*
examining the impact of education on the intercept and slope, in the same manner models were tested constraining the pathways for income, cognitive readiness, and instrumental support to the intercept and slope. In each case, the restricted models were not significantly different from the unrestricted model, indicating that the path coefficients could remain fixed as equal across groups. Similarly, models were tested restricting the paths from intercept and slope to expressive communication and auditory comprehension to be the same for teens and adults. These models were also not significantly different from the unrestricted model, providing evidence that the warmth trajectory influenced language development similarly for teens and adults. In conclusion, teens and adults had the same mean slope, variances, and path coefficients, and only differed on the level of warmth at 4 months.

In conclusion, the final growth curve model of warmth (see Figure 2) had an excellent fit, \( \chi^2(45, N=682) = 41.5, p > .05; \) RMSEA = 0.000; CFI = 1.0, and is presented in Figure 2. All path coefficients were the same for both teens and adults. In this model the intercept was significant, but the slope was not, indicating that there was no change in warmth over time. When comparing the intercept for teens with the intercept for adults, the adults displayed significantly higher warmth at 4 months than did teens. For both groups the intercept was predicted by cognitive readiness (\( B = .09, \) S.E. = .03, \( p < .01 \)), but none of the predictors were related to the slope. In terms of the language outcomes, the intercept predicted expressive communication for both groups (\( B = .83, \) S.E.= .39, \( p < .05 \)), but the slope was unrelated to language scores. Thus, prenatal cognitive readiness predicted mothers’ warmth at 4 months, which, in turn, was significantly related to children’s expressive language at 24 months of age. These relationships were the same.
for teens and adults, although in comparison with teens, adults had higher levels of warmth at 4 months and children of adults had higher language scores.

**Figure 2. Latent Growth Curve Model of Warmth with Predictors, Covariates and Outcome Variables**

**p < .01, *p < .05**
Unconditional growth curve model of lack of hostility. A series of nested models was also examined for the growth curve of lack of hostility. As with previous growth curve models, latent intercept and slope factors were indicated by the lack of hostility variable at 4, 8, and 18 months, with the factor loadings for the intercept set to 1 and the loadings for the slope set to 0, 1, and 3.5. No error variances were allowed to correlate.

The first set of model comparisons was conducted for the unconditional growth model (no predictors, covariates, or outcome variables) to test for group differences in the means and variances of the intercept and slope factors. The unrestricted model, which allowed the means and variances to be freely estimated in each group, displayed good fit, $\chi^2 (2, N = 553) = 3.7, p > .05$; RMSEA = .06; CFI = .96. When the intercept means were constrained to be the same for both groups, however, the restricted model had a significantly worse fit than the original model, $\chi^2 (1, N = 553) = 1041.7, p < .05$, indicating that the intercept means should be estimated separately for teens and adults.

Next, a model was estimated where the slope means were set to be equal across groups and this model likewise fit significantly worse than the unrestricted model, $\chi^2 (1, N = 553) = 92.6, p < .05$. As such, teens and adults had different initial levels of lack of hostility in addition to different rates of change over time. Specifically, adults had significantly lower levels of hostility at 4 months than teens. Although both teens and adults displayed negative slopes (becoming more hostile over time), teens were becoming hostile at a faster rate than adults.

After examining group differences in the means for the intercept and slope factors, differences between teens and adults in the variability around the intercept and slope were evaluated. In a restricted version of the original unrestricted model, the
variance for the intercept factor was constrained to be equal in both groups. According to the likelihood ratio test, this model was not significantly different from the unrestricted model, $\chi^2 (1, N = 553) = 2.1$, $p > .05$, indicating that it was acceptable to have the intercept variance be the same for teens and adults. Similarly, a model was tested with the slope variance set to be the same in both groups and this model was not significantly different from the unrestricted model, indicating that it was reasonable to let both groups have the same variance for the slope factor. In sum, the multi-group comparisons of the unconditional model indicated that teens and adults had different initial levels of lack of hostility and different rates of change, but that they had equivalent variability in their initial levels and rates of change.

*Conditional growth curve model of hostility.* Next, a family of nested models was conducted for the conditional growth model for lack of hostility, with cognitive readiness and paternal support operating as predictors of intercept and slope, which in turn predicted expressive communication and auditory comprehension. Education and income were also included as covariates on the intercept and slope. The fit indices and chi square differences for each comparative model are presented in Table 5. For each model, the intercept and slope means were estimated separately for teens and adults, but the intercept and slope variances were restricted to be equal across groups. No error variances were allowed to correlate.

The first step in examining group differences in the conditional growth model of lack of hostility was to test an unrestricted model which allowed all path coefficients to be estimated separately for teens and adults. This model (H1) displayed good fit (RMSEA = .02; CFI = .98). Next, a model was tested which constrained the path from
TABLE 5
MODEL FIT INDICES AND NESTED MODEL COMPARISONS IN CONDITIONAL GROWTH CURVE ANALYSES OF LACK OF HOSTILITY

<table>
<thead>
<tr>
<th>Model Specification</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Model Comparison</th>
<th>$\Delta \chi^2$</th>
<th>$\Delta$ df</th>
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<th>RMSEA</th>
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<td>.98</td>
<td>.02</td>
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<td>Constrained education $\rightarrow$ intercept</td>
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Note. $N = 682$. Model H12 was accepted as the most adequate model. Model H13 was rejected because it contained negative residual variances. CFI = Comparative Fit Index and RMSEA = Root Mean Square Error of Approximation.
education to the intercept to be equal for both groups. According to the likelihood ratio test, this model (H2) was not significantly different from the unrestricted conditional model (H1), $\chi^2 (1, N = 682) = 0.95, p > .05$, indicating that it was appropriate to keep this parameter the same for teens and adults. Similarly, the model (H3) which set the path from education to the slope did not fit significantly differently than the unrestricted model, $\chi^2 (2, N = 682) = .97, p > .05$, indicating that that path should remain the same for both groups. Thus, the covariate education was operating similarly for teens as for adults.

Subsequent models were compared that restricted the paths from income, cognitive readiness, and paternal support to the intercept and slope factors to be equal for teens and adults. In all of these models, the fit was not significantly worse than the original unrestricted model (H1), signifying that it was acceptable to keep these paths the same in both groups. The path coefficients from intercept and slope to auditory comprehension were also allowed to be the same for teens and adults, as was the path from the intercept to expressive communication. The model constraining the path from the rate of change in hostility to expressive communication, however, was rejected because it displayed negative residual variances. Thus, the path from slope to expressive language was estimated separately for teens and adults.

In summary, the final growth curve model of lack of hostility (see Figure 3) displayed excellent fit, $\chi^2 (44, N = 682) = 48.0, p > .05$; RMSEA = .02; CFI = .98. In this model, adults had lower levels of hostility at 4 months and were engaging in hostile parenting at a slower rate than teens. All path coefficients were the same for teens and adults except for the path from the slope to expressive communication. Paternal support predicted both the intercept (B = .04, S.E. = .02, $p < .05$) and slope (B = -.03, S.E. = .01,
in both groups, with higher expectations of support prenatally being related to lower hostility at 4 months. Prenatal expectations of support from fathers were negatively related with the rate of change in hostility. Specifically, mothers who had higher expectations of support demonstrated the slower change in hostility from 4 to 18 months. The relationship between slope and expressive communication was approaching significance for teens (B = -4.2, S.E. = 2.6, \(p < .10\)), but not for adults (B = .18, S.E. = 1.6, > .05), with slower change in hostility over time associated with higher language scores in teens.

**Growth curve model of support for learning and literacy.** A final growth curve model was examined for the support for learning and literacy variable. Similar to prior models, support for learning and literacy at 4, 8, and 18 months served as indicators of the latent intercept and slope factors. The factor loadings for the intercept were set to 1, whereas the loadings for the slope were 0, 1, and 3.5. No error variances were allowed to correlate. This model was also tested as a multi-group analysis, beginning with an unrestricted model where intercepts, variances, and path coefficients were allowed to be estimated separately for teens and adults. This model displayed poor fit, \(\chi^2 (2, N = 553) = 12.4, p < .05\); RMSEA = .138; CFI = .96, and multiple modifications were suggested by the modification indices. These modifications, however, were not theoretically reasonable. Additionally, the model displayed negative residual variances. Given the poor fit of this model, subsequent tests for differences in parameters between teens and adults were not conducted.
Note. Estimates for adolescents appear in bold.

Figure 3. Latent Growth Curve Model of Lack of Hostility with Predictors, Covariates, and Outcome Variables.
**Summary**

In conclusion, the present study explored parenting in adolescents and adults from 4 to 18 months of age as well as the influence of early parenting on children’s language development at 24 months. Two latent growth curve models displayed good fit: warmth and lack of hostility. Adults displayed higher initial levels of warmth and lower initial levels of hostility in comparison with adolescents. Adults also had slower rates of change in hostility from 4 to 18 months than teens, with teens becoming hostile more quickly than adults. For both teens and adults, prenatal cognitive readiness was related to higher levels of warmth at 4 months, which in turn predicted children’s expressive language at 24 months. Maternal expectations of support from the children’s fathers were associated with lower levels of hostility at 4 months. High expectations were also associated with slower increases in hostility over time. Associations between paternal support and lack of hostility were the same for adolescents and adults.
DISCUSSION

The present study utilized LGC modeling to explore changes in parenting behavior from 4 to 18 months in a diverse sample of first-time adolescent and adult mothers. Multiple data points and LGC modeling allowed for thorough explorations of the antecedents and consequences of changes in parenting over time, improving upon previous work that has neglected to investigate parenting as a dynamic process. Instead, the majority of past research studies during the 0-3 period have used cross-sectional data or assumed change with only two time points (i.e., Whiteside-Mansell et al., 1996). The present study also employed multi-group comparisons to explore differences between teens and adults. In addition to comparing group means, the method of analysis allowed for an assessment of the strength of relationships among constructs. In sum, the inclusion of sophisticated analytic techniques permitted the investigation of complex questions regarding how parenting processes, such as warmth and hostility, influence children’s language development.

Stability and Change in Parenting over Time

In the present study adolescents exhibited fewer warmth behaviors than adult mothers when children were 4 months of age, replicating previous findings of decreased levels of warmth and responsiveness from teenaged mothers (Keown et al., 2001; Luster & Vandenberg, 1999). Although adolescents differed from adults in terms of their initial levels of warmth, both groups were similar in terms of their patterns of warmth behaviors...
in that there was no evidence for mean change over time. The indication that levels of warmth remained stable during the first 18 months of life contrasts with suggestions that maternal sensitivity is likely to change during infancy (Lohaus et al., 2004). Thus, warmth may operate differently than other aspects of parenting, perhaps because of its trait-based nature (Schreiber, Breier, & Pickar, 1995).

Warmth was not the only parenting behavior in which differences between adolescents and adults emerged. In the present study, adolescents had higher initial levels of hostility than their adult counterparts and faster increases in hostility over time. Although the fact that teens in the present study exhibited more hostility than adults at 4 months was not surprising (Whitman et al., 2001), it was interesting that both teens and adults displayed increased levels of hostility as their children aged. It is possible that increases in hostility from 4 to 18 months reflected normative changes in parenting strategies from infancy to toddlerhood. Specifically, as children became mobile and began to assert their own autonomy, mothers responded with more restrictive and punitive parenting to manage their children’s exploratory behaviors. Teens in the present sample were, however, increasing in their hostility at a faster rate than adults. These findings are consistent the high rates of child abuse found in adolescent populations (Bolton, 1990; Lee & George, 1999) by demonstrating that adolescents not only began parenting in a hostile fashion, but also continued in a pattern of critical and restrictive behaviors as their children developed. Furthermore, adolescents in the current study had higher levels of hostility than mothers in the Early Head Start Research and Evaluation Project (Fuligni et al., 2004), suggesting that teens in the present study may be at a particularly high-risk for maltreating their children.
Predictors of Parenting

Because patterns of warmth did not change over time, it is possible that differences between adolescents and adults on initial levels of warmth reflected differences in cognitive readiness to parent. As hypothesized, cognitive readiness was an important predictor of maternal warmth, consistent with the Whitman et al. (2001) model of adolescent parenting. Similar to past research with adolescents, teens in the current study had significantly lower levels of cognitive readiness than adults (Sommer et al., 1993). Interestingly, though adults, on average, were more cognitively prepared for parenting than teens, the relationship between readiness and warmth in the present study was the same in both groups: Greater prenatal cognitive readiness was associated with higher levels of warmth at 4 months, analogous to previous studies of adolescent parenting during infancy (O’Callaghan et al., 1999). Traditionally, cognitive readiness has been viewed as a component unique to models of adolescent parenting (Whitman et al., 2001). These findings, however, indicate that theoretical models of “on-time” parenting would likely benefit from the inclusion of cognitive readiness as a determinant of maternal warmth.

The LGC modeling in this study further detailed possible family factors during pregnancy that were related to with maternal hostility during infancy. For instance, high expectations of support from fathers were associated with low maternal hostility at 4 months for both the teen and adult groups. Although on average mothers were increasing in their hostility over time, expectations of paternal support appeared to act as a buffer by slowing down the rate of change in hostility in both groups. Specifically, mothers with higher support expectations had slower rates of change, indicating that when they
anticipated high post-natal support from fathers, they were slower to engage in harsh parenting as children aged. It is also important to emphasize that the relationship between expectations of support and parenting were the same in both groups, indicating that paternal support and involvement is a critical protective factor, regardless of maternal age or family structure. These findings were consistent with theories of parenting regarding the importance of social support and father involvement on maternal parenting practices (Bunting & McAuley, 2004; Howard et al., 2006; Whitman et al., 2001). Previous explorations of father involvement in the present data set have demonstrated that for most mothers at 4 months prenatal expectations of support were met (Howard et al., 2006). However, declines in father involvement over time have been associated with increases in maternal stress in adolescent mothers (Kalil, Ziol-Guest, & Coley, 2005). Lack of paternal support, or unmet expectations of support, may leave mothers drained of emotional and financial resources and subsequently serve to increase parenting stress, perhaps resulting in increased hostility over time.

**Parenting and Children’s Language Development**

The present study also found that maternal warmth at 4 months predicted children’s expressive language skills at 24 months of age. The association between warmth and language was the same regardless of maternal age, suggesting that increases in cognitive readiness for both teens and adults not only would impact maternal warmth, but would also have spill-over effects for children’s language development. Consistent with findings in other samples (Whitman et al., 2001), children of adolescent mothers had significantly lower expressive language scores than children of adults, with 23% of
children of teens in a delayed range in contrast with 12% of children of adults.

Particularly noteworthy was that there were no significant changes in warmth over time, indicating that mothers who were originally low on warmth did not “catch up” as their children aged. These children may be particularly at-risk for later developmental problems as a result of long-term exposure to less-than-optimal parent interactions.

Initial levels of hostility were unrelated to children’s language outcomes at 24 months; however, there was a marginally significant relationship between rate of change in hostility and expressive language in the adolescent group. Mothers who were changing at a slower rate had children with higher expressive language scores, suggesting that in the case of hostility, less change was better for children’s development. It is likely that since most teens were becoming more hostile with time, developmental benefits accrued for children whose mothers were less rapid in their increases in hostility. It is important to note, however, that this relationship was only marginally significant and only present for the adolescent group. These findings do highlight, however, how sophisticated analytic techniques, such as LGC modeling, can answer questions traditional methods cannot. In this case, level of hostility at any given time point was not related to children’s language, but the change in hostility was associated with children’s language.

Limitations and Future Directions

Although there was some evidence for the impact of parenting on language development in the present study, children’s language was only assessed at one point in time and with one measurement instrument. It may be that evaluating language skills in a single testing setting did not capture the full range of children’s abilities. Although
attempts were made to create fair testing situations, many examinations occurred in children’s homes and may not have allowed children to have equal opportunities for demonstrating their language skills. The inclusion of multiple indicators of language, such as maternal reports of expressive skills or play interactions coded for length of utterances, would be beneficial to capture children’s language skills more completely. It might also be informative to explore how patterns of parenting relate to developmental trajectories of language.

Although hostility in the present study was not directly related to children’s language development, there was some evidence suggesting that changes in hostility among teens was related to children’s language expression. It may be that inconsistent parenting practices, characterized by changes in harshness and restrictive discipline, negatively influenced child development. Future studies should investigate changes in parenting practices over a longer period and with shorter measurement intervals. Dynamical systems analysis would be an appropriate statistical approach for measuring fluctuations in parenting practices on a daily or weekly basis (Carothers et al., in press). In particular, adolescents may have larger fluctuations in their parenting behaviors than adults, creating parenting inconsistencies that produce confusion in the child. Relationships between inconsistent parenting and harsh parenting may reveal greater insight into complex prediction of children’s language deficiencies.

Finally, the present study demonstrated a link between prenatal expectations of paternal support and patterns of hostility over time. There remain, however, questions regarding how received support, in contrast with expectations, relates to maternal parenting practices. Future work should examine trends in support from fathers over time,
in both adolescents and adults, and how support and maternal parenting may have interlinked trajectories. In these instances, mother-father relationship quality and levels of conflict in the home would also be important considerations.

Conclusions

In summary, adolescent mothers in the present study displayed, on average, lower levels of warmth and higher levels of hostility than adults when their children were 4 months of age. Furthermore, cognitive readiness to parent and social support from fathers were important predictors of parenting in both groups, indicating that support and readiness operated similarly for teens and adults. Early positive parenting was also associated with children’s higher expressive language for adults and teens. Given the similarities between teens and adults in these relationships, it’s may be that adults as well as teens would gain from early parent training. A universal, family-centered parenting program, with an emphasis on increasing knowledge of child development, positive parenting attitudes, and father involvement, could be beneficial for mothers and children from diverse backgrounds. Often parenting interventions focus primarily on families deemed to be at the “highest risk.” The present study, however, suggests that new mothers may benefit from policies and practices that aid in developing cognitive readiness and increasing paternal support, regardless of the age at which they begin their transition to parenthood.
REFERENCES


Chan, D. (1998). The conceptualization and analysis of change over time: An integrative approach incorporating longitudinal mean and covariance structures analysis (LMACS) and multiple indicator latent growth modeling (MLGM). *Organizational Research Methods, 1,* 421-483.


APPENDIX

Infant-Toddler HOME Subscale Items

*Parental Warmth*

Parent spontaneously vocalizes to child at least twice during the visit.
Parent responds verbally to child's vocalization and verbalization
Parent tells child the name of an object or person during the visit.
Parent spontaneously praises child at least twice during the visit.
Parent's voice conveys positive feeling about the child.
Parent responds positively to praise of child offered by visitor.
Parent caresses or kisses child at least once during the visit.

*Parental Verbal Skills*

Parent's speech is distinct, clear, and audible.
Parent initiates verbal interchanges with the interviewer.
Parent converses freely and easily.

*Support of Learning and Literacy*

Child has cuddly toys or role-playing toys.
Child has learning facilitators-mobile, table and chair, highchair, or playpen.
Child has toys for literature and music.
Child has 3 or more books of his/her own.
Parent talks to child while doing household work.

Parent reads stories to child at least 3 times a week.

At least 10 books are present and visible.

Parent provides toys for the child to play with during the visit.

*Lack of Hostility*

Parent does not shout at child during the visit.

Parent does not express overt annoyance with or hostility to the child.

Parent does not slap or spank the child during the visit.

Parent does not scold or criticize the child during the visit.

Parent does not interfere with or restrict child more than twice during the visit.