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A Longitudinal Process Analysis of Mother-Child Emotional Relationships in a Rural Appalachian European American Community

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Abstract

This prospective longitudinal study examines emotional relationships in 58 Appalachian mother-child dyads observed at home at 5 and 20 months. Between infancy and toddlerhood, 3 of 4 dimensions of dyadic emotional relationships were stable, and 3 remained continuous in their mean level. Increasing maternal age was associated with greater maternal sensitivity and structuring and with more responsive and involving children. Marital status and father presence in the home as well as maternal openness, parenting knowledge, investment, and satisfaction accounted for effects of maternal age on dyadic emotional relationships. This longitudinal process analysis provides unique insights into temporal dynamics of mother-child emotional relationships and their determinants in an underserved and underresearched U.S. community. Implications for community-specific interventions are discussed.

Keywords

emotional availability; maternal age; Appalachia

Introduction

This work unites three seemingly disparate topics: the Appalachian community, the role of maternal age in parenting and family life, and the dynamics of mother-child mutual emotional relationships. Leading to their coordinated study, we review each in turn, rationalizing our motives for examining the intersection of the three.

Rural Appalachian Parenting

The rural Appalachian community, historically marginalized in American society (Abramson & Haskell, 2006; Harrington, 1962; Williams, 2002), suffers chronic high poverty and low levels of education (USDA Economic Research Service, 2010), and West Virginia, the only U.S. state entirely within the Appalachian region and where we conducted this study, has the highest poverty rate in the United States for European American children, double the national average (National Center for Children in Poverty, 2010). In poor rural communities, negative life events and psychological and physiological stressors on parents are typically high (Simons, Johnson, Conger, & Lorenz, 1997), and effects of economic hardship on children are at least partially mediated by parenting (McLoyd, Aikens, &

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Burton, 2006). In consequence, it is imperative to set studies of parenting and child developmentfocused on micro-systems within larger macro-system community contexts (Bronfenbrenner & Morris, 2006); this strategy constitutes a community psychology approach, and one that we adopt here.

Furthermore, research on parenting and family life in the Appalachian community is rare. Early observations portrayed rural Appalachian parents as infant-centered but less involved and increasingly authoritarian as their children develop (Looff, 1971). More recent reports concur that Appalachian mothers are positive with their infants, but increasingly negative with older children (Fish, Amerikaner, & Lucas, 2007; Fish & Stifter, 1999). One especially prominent characteristic of parenting in rural Appalachia is early parturition (West Virginia Kids Count Fund, 2009).

Maternal Age and Family Life

Maternal chronological age is a significant sociodemographic characteristic that affects parenting and child development. Garrett, Ferron, Ng'andu, Bryant, and Harbin's (1994) structural model of the determinants of children's motor and social development revealed that mothers' readiness to be a parent was determined by their competency and maturity as indexed by mothers' chronological age at childbirth. Indeed, maternal age at parturition uniquely predicts educational and psychosocial outcomes in children at least up to age 18 (Fergusson & Woodward, 1999).

Research has broadly questioned the quality of childrearing in older and younger mothers. Tending and rearing children are physically challenging, and older primiparas may possess diminished physical capacities to meet those demands (Mirowsky, 2002). Younger mothers are known to command less knowledge about parenting, to express less desirable childrearing attitudes, and to hold less realistic expectations about child development than adult mothers (Bornstein & Putnick, 2007), and they are less sensitive, appropriate, and responsive to their children (Bornstein, Putnick, Suwalsky, & Gini, 2006). Thus, teenage mothers of 4-month-olds in Early Head Start display lower levels of cognitive readiness, parenting warmth, support for language, learning, and developmental advancement as well as more negative parenting behavior than adult mothers (Atwater et al., 2006).

Here we asked what specific age-related factors underlie parenting risk. One set is constituted by the supportive family context. Parenting support plays a role in mothers' adjustment to parenthood (Chase-Lansdale, Brooks-Gunn, & Zamsky, 1994). Father support is positively associated with adolescent mothers' self-esteem and efficacy and negatively associated with life stress (Shapiro & Mangelsdorf, 1994), and father support mitigates angry, punitive parenting in young mothers (Crockenberg, 1987). Also, spousal emotional and childcare supports are associated with positive maternal affect (Levitt, Weber, & Clark, 1986).

Partner support and support provided by the maternal grandmother are often rated as equally important by mothers (Gee & Rhodes, 1999). Younger mothers are likely to reside in households with extended family members, and this support is associated with mothers' greater life satisfaction, diminished stress, enhanced self-esteem, and responsive parenting (Luker, 1997). At 1 month postpartum, adolescent mothers with more support reportedly have a greater sense of parenting competency (Mercer, Hackley, & Bostrom, 1984), and more childcare support is associated with higher quality mother-infant interactions (Levine, Garcia-Coll, & Oh, 1985). Support from extended family decreases with increasing maternal age (Bornstein et al., 2006).

A second set of age-related determinants of parenting risk is intrapersonal: the cognitive and socioemotional competencies that women bring to parenting as well as their attitudes about parenting. General intelligence is one cognitive factor. Education is another cognitive factor and is tied to age. Increasingly, women are delaying childbearing to pursue advanced education. By contrast, early parenthood is associated with attending low-quality schools, having parents with little education, school failure, early withdrawal from school, and low educational aspirations (Coley & Chase-Lansdale, 1998). Younger mothers also possess less specific knowledge about childrearing and child development, a third cognitive factor, than do older mothers (Bornstein & Putnick, 2007; Field, Widmayer, Stringer, & Ignatoff, 1980). Sommer and colleagues (1993) aggregated knowledge of child development, parenting attitudes, and parenting styles into a construct called "cognitive readiness to parent." Younger mothers scored lower than older mothers on this construct when assessed prenatally, and cognitive readiness to parent predicted parenting during infancy (Whitman, Borkowski, Keogh, & Weed, 2001).

The other set of intrapersonal determinants of parenting risk is socioemotional. The "maternal maturity hypothesis" suggests that younger mothers are less likely to provide their children skilled and appropriate parenting or an optimal home environment (Hofferth, 1987) because younger women are coping with multiple developmental challenges endemic to their own still incomplete developmental status (Havighurst, 1972). Roberts, Walton, and Viechtbauer (2006) reported, on the basis of a meta-analysis of 92 samples, that none of the Big Five personality factors crystallizes until later in life. For example, Openness is associated with more nurturance and support and less negative control of children (Losoya, Callor, Rowe, & Goldsmith, 1997). One socioemotional factor we studied in mothers was personality. A second factor was self-perceptions of parenting (competence, investment, satisfaction, and role balance), which are also believed to shape parents' sense of self, motivate and influence parenting activities, and afford organization and coherence to the tasks of parenting (Sigel & McGillicuddy-De Lisi, 2002). For example, mothers' investment in the parenting role relates reliably to specific parenting practices, and positive parenting practices in turn relate to positive child states and behaviors (Coleman & Karraker, 1998). The third factor we measured was mothers' attributions for their parenting successes and failures; they constitute key emotional climate variables in the family (Bugental & Happaney, 2002) and yield insight into parent sensitivity (Weiner et al., 1972).

Emotional Relationships and their Developmental Dynamics in Mothers and their Children

Cohesive parent-child relationships, characterized by emotional connection and warm affect and interaction, create dyadic and family climates that foster positive development (Soenens, Vansteenkiste, Luyckx, & Goossens, 2006), whereas negative emotional relationships in the family are undermining. Emotional exchanges between young children and their caregivers encompass both emotional signaling and emotional understanding as well as emotional accessibility of each to the other (Bornstein, Suwalsky, & Breakstone, 2012). When parents experience general stress stemming from a dearth of capital, as would be true in rural Appalachian communities, they are less emotionally available to their children (Steinberg, Catalano, & Dooley, 1981).

This Study

Here we address three specific questions in a community sample of rural, European American, Appalachian mothers and infants. The first concerned the role of maternal age in the expression of mother-child mutual emotional relationships, as measured by the *Emotional Availability Scales* (EA Scales 3rd ed.; Biringen, Robinson, & Emde, 1998). Based on the available literature, we expected older mothers to be more sensitive and structuring with their young children.

The second related question asked which sets of determinants (family context, cognitive, socioemotional), and which specific constituents within those sets, account for age-related differences in mother-child emotional relationships. We predicted that increasing maternal age would be related to more support from fathers and extended family and that more support would be related to better dyadic mother-child emotional relationships. We also expected older mothers to command better cognitive and socioemotional resources, which would promote their emotional relationships.

The third question capitalized on the longitudinal design of the study to evaluate group mean-level continuity and individual-variation stability in mother-child emotional relationships. If emotional relationships showed continuity, mothers and children would display the same mean levels earlier and later in the child's development. If emotional relationships showed stability, those individual mothers and children who displayed better emotional relationships earlier in the child's development relative to their peers would also display better levels later. Continuity and stability reflect theoretically, statistically, and practically distinguishable and independent aspects of development (Bornstein & Bornstein, 2008; Hartmann, Pelzel, & Abbott, 2011). Previous studies have reported mixed developmental continuity and discontinuity in the EA Scales (e.g., increases in Sensitivity and Involvement between 9 and 14 months in Biringen et al., 1999; increases in Responsiveness and Involvement, but continuity in Sensitivity and Structuring, between 19 and 24 months in Lovas, 2005). Based on the extant literature, we expected to find a mixture of continuity and discontinuity in Appalachian mothers and children. By contrast, studies using the EA Scales support stabilities across the age range we tested here (Biringen, Matheny, Bretherton, Renouf, & Sherman, 2000; Lovas, 2005). However, child behavior changes with development from infancy to toddlerhood in ways that present variable parenting challenges. Thus, child-mother dyads could be unstable in their emotional relationships. We therefore expected only moderate levels of individual stability in mothers and children across this period.

Method

Participants

Altogether, 58 European American mother-child dyads from rural West Virginia were observed at home twice. Children were all firstborn, healthy, and weighed 3512.73 g (*SD* = 523.07) on average at birth. They averaged 5.34 months (*SD* = .16) at the first visit and 20.08 months (*SD* = .22) at the second visit. Approximately equal numbers of girls and boys participated (52% girls).

Mothers ranged in age from 13 to 40 years when they gave birth, *M* = 23.26, *SD* = 5.93. Twenty-four (41%) mothers were adolescents (≤ 19 years old) when their child was born. Many mothers were married to (65.52%) and co-resident with (79.31%) the child's father, and 26% lived with extended family members (22% with their own mothers). Twenty-six percent of mothers had not completed high school, 31% were high school graduates, 28% had attended partial college, and 15% had a college degree. Over one-half of mothers were working at the times of the 5- and 20-month visits (52% and 60%, respectively). Of those who were working, average weekly hours of employment were 32.78 (*SD* = 9.37) at 5 months and 35.16 (*SD* = 8.76) at 20 months. At 5 months, family socioeconomic status averaged 34.36 (*SD* = 8.07) on the Hollingshead (1975) *Four-Factor Index of Social Status* (range = 14-53 in a possible range of 8-66). Median household incomes for the census tracts in which the families lived ranged from $16,071 to $51,025 (U.S. Department of Commerce, 1997; note that these numbers can be misleading because households ranged in size from 2 to 10 members). Nearly 20% of the families lived in census tracts where the median

household income was within 200% of the poverty line, which qualified them for government assistance (e.g., food stamps, TANF).

Families were recruited through contacts with hospitals, health clinics, and other community gathering places in West Virginia (mostly Berkeley, Jefferson, and Morgan counties). As an illustration of the rural community settings, families generally lived along countrysides of rolling hills, with small towns and villages tucked away along winding, often 2-lane by-roads. A proportion of families did not have house numbers, but use RD addresses. Attrition from 5 to 20 months was 25%, primarily resulting from an inability to re-locate participants. Mothers who did not participate at the second time point were younger than mothers who did, $t(60.45) = -4.50$, $p < .001$ (15 of the 19 mothers who were lost were adolescents), but 5-month EA Scale scores and family SES did not differ between the 19 mothers who were lost and the 58 who were retained, $ts(75) = -1.93$ to .10, *ns*.

Procedures

Each dyad was visited at home in the child's infancy and toddlerhood, during times when the child was awake and alert. At 5 months 15 min of mother-infant naturally occurring interaction, and at 20 months 10 min of mother-child play interaction, were videorecorded by a single female researcher. Although data collection at the two ages differed, both provided home-based, nonstressful, age-appropriate contexts for assessing natural and typical mother-child relationships. At the 5-month visit, mothers completed a demographic questionnaire. Prior to the 20-month visit, mothers completed questionnaires assessing their knowledge of parenting and child development, personality, perceptions of their own parenting, and parenting attributions. At the 20-month visit, an estimate of maternal verbal intelligence was obtained.

Emotional Relationships

Mother-child emotional relationships were evaluated from the videorecords using four of the *Emotional Availability Scales* (EA Scales 3rd ed.; Biringen et al., 1998). Maternal *Sensitivity* assessed acceptance, flexibility, affect regulation, conflict resolution, and the variety and creativity of interactions, and *Structuring* assessed the degree to which mother appropriately facilitated, scaffolded, and organized child play, exploration, and routine by providing rules, regulations, and a supportive framework for interaction without compromising the child's autonomy. Child *Responsiveness* focused on the age- and context-appropriate balance between the child's interest in exploring the environment and in responding to the mother's bids, and *Involvement of Mother* assessed the child's ability, willingness, and success in engaging the mother. All EA Scales were rated in half-points. (We do not report two EA Scales, maternal Nonintrusiveness and Nonhostility, because these codes were designed to capture relatively infrequent negative behaviors that are uncommon in healthy community samples and in preliminary analyses low scores on these two Scales were so infrequent that they did not have sufficient variance to use as outcomes in parametric tests.) Coders blind to study hypotheses were trained to reliability with one of the authors of the EA Scales (Z. Biringen), who coded a standard reference set of videorecords. The 5- and 20-month records for a given dyad were rated by different coders who were reliable with one another. Reliability was assessed using average absolute agreement intraclass correlation coefficients (*ICC*) in a two-way random-effects model (McGraw & Wong, 1996) on 25% of the interactions and ranged from .70 to .92 at 5 months and .88 to .94 at 20 months.

Explanatory Determinants

Family context determinants—Mothers rated parenting support provided by the child's father and extended family (maternal grandmother, paternal grandmother, other relatives) on

a scale from 0 = *no/little help* to 4 = *very helpful. Marital status* (0 = *not married*, 1 = *married*) and *father presence* in the home (0 = *father did not reside in the child's home*, 1 = *father resided in the child's home*) were positively related, $\chi^2(1, N = 58) = 15.98$, $p < .001$, but 21% of the sample were either co-resident and not married or married but not co-resident. The mother's perception of *father involvement* with the child was the average of 14 maternal ratings (0 = *never* to 4 = *usually*) of the frequency with which father engaged in basic caregiving tasks and played and talked with the baby ($\alpha = .95$). The mother's perception of *father social interaction* with the child was the average of 5 maternal ratings of the frequency (0 = *not at all* to 5 = *all the time*) with which fathers engaged in social behaviors with the child ($\alpha = .90$). Father involvement and social interaction shared only 16% of common variance.

Cognitive determinants—Mothers were administered the *Peabody Picture Vocabulary Test-Revised* (PPVT-R Form L; Dunn & Dunn, 1981), a measure of receptive language ability that is highly correlated with intelligence. Age-normed standard scores were used. The *Knowledge of Infant Development Inventory* (KIDI; MacPhee, 1981) is comprised of 75 items used to assess knowledge of parental practices, developmental processes, health and safety guidelines, and norms. The proportion of correct items was used. The 2-week test-retest stabilities for mothers ($N = 58$) range from .90 to .92; split-half reliabilities average .72 (MacPhee, 1981).

Socioemotional Determinants—Eleven scales of the *Jackson Personality Inventory* (JPI; Jackson, 1976) were completed by mothers. Following Paunonen and Jackson (1996), 3 principal components were extracted (Openness, Neuroticism, and Extraversion) and 2 JPI scales (Conscientiousness and Trustworthiness) were used for the five personality dimensions. Maternal competence, investment, satisfaction, and role balance in parenting were evaluated using the *Self-Perceptions of the Parental Role* (SPPR; MacPhee, Benson, & Bullock, 1986). In the current sample, αs for the 4 scales were .74, .71, .75, and .69, respectively. The *Parent Attributions Questionnaire* (PAQ; Sirignano & Lachman, 1985) contains 5 causal attributions (mothers' ability, effort, and mood, difficulty of the task, and child behavior) to explain successes and failures in 7 common parenting tasks. Internal Attributions of Failure ($\alpha = .92$) and Internal Attributions of Success ($\alpha = .92$) scales were each computed as the mean of 3 subscale scores: the sums of the 7 ratings attributing failures or successes to maternal ability, effort, and mood. External Attributions of Failure ($\alpha = .83$) and External Attributions of Success ($\alpha = .83$) scales were each computed as the mean of two subscale scores: the sums of the 7 ratings attributing failures or successes to the difficulty of the task or to child behavior.

Preliminary Analyses and Analytic Plan

Univariate distributions of EA Scale scores and all determinants were examined for normalcy, homogeneity of variance, outliers, and influential cases. No outliers or influential cases were found. Transformations were used to normalize distributions, and analyses were conducted on the transformed data; for clarity, descriptive statistics are presented in variables' original metrics. Preliminary *t*-tests of the EA Scales by child gender were nonsignificant, $ts(56) = -.66$ to 1.87, *ns*; therefore, data for families with girls and boys were combined.

Analyses were designed to address the three questions set forth in the Introduction. First, descriptive statistics are presented. Second, repeated-measures linear mixed models (Wallace & Green, 2002) were computed on maternal Sensitivity and Structuring and child Responsiveness and Involvement to assess relations with maternal age and mean level across child age (continuity). Child age (5 vs. 20 months) was modeled as a repeated within-

subjects fixed effect, and the covariance structure was modeled as heterogeneous compound symmetry, accounting for the likelihood that similar EA Scales would be correlated across time, but scale variances could change from 5 to 20 months. (Effect sizes are not available for linear mixed models.) Maternal age was modeled as a continuous fixed effect. Most studies occupied with the role of maternal age in parenting have compared younger (adolescent) mothers dichotomously with older (adult) mothers. However, this categorical approach has several conceptual and statistical drawbacks: (a) it forces arbitrary cleavage of the age continuum; (b) dichotomizing a continuous variable in analysis necessarily discards information, adversely affects the power to detect effects, and can produce spurious main effects or interactions (MacCallum, Zhang, Preacher, & Rucker, 2002); (c) there is reason to believe that neither "adolescent" nor "adult" mothers constitute homogeneous age groupings; and (d) chronological age is the most commonly used variable of its ilk in medicine, epidemiology, and demography. Following baseline models, third, explanatory family context, cognitive, and socioemotional determinants were controlled in blocks and in separate analyses, permitting inferences about which specific determinant sets and constituent(s) best explain effects between maternal age and mother-child emotional relationships. Fourth, stability across time was assessed with correlations between corresponding 5- and 20-month EA Scales.

Results

Descriptive Statistics and Correlations

Table 1 displays descriptive statistics for all EA Scales and correlations with maternal age. Within each visit, the 4 EA Scales shared between 53.29 and 79.21% of their variance; separate analyses were conducted for each because each Scale has independent theoretical standing in the literature (Biringen, 2009), and we wanted to explore patterns of relations of maternal age with determinants of each. Table 2 displays descriptive statistics and correlations of family context, cognitive, and socioemotional explanatory determinant sets and their constituents with the EA Scales.

Relations of Emotional Availability Scales with Maternal Age, Continuity of Emotional Availability Scales across Child Age, and Explanatory Determinants and Constituents

Results of the baseline models, and models controlling family context, cognitive, and socioemotional determinant sets, are presented in Table 3.

Baseline models—No interaction between maternal age and child age emerged for any EA Scale. Increasing maternal age was associated with higher scores on all EA Scales. Maternal Structuring was more optimal at 5 months than at 20 months. (We conducted supplementary analyses using an adolescent-adult dichotomous grouping variable in place of maternal age, and the same pattern of results emerged. The main effects of maternal age were still significant, indicating that the continuous age effects we found also reflect a difference between adolescent and adult mothers.)

We next explored family context, cognitive, and socioemotional constituents to help to explain what about maternal age is associated with EA Scale scores. Because of sample size limitations, we controlled only constituents with significant zero-order associations with the EA Scales (see Table 2). If the association between maternal age and EA attenuated when controlling for a constituent, the constituent explained the relation between maternal age and EA Scale score (MacKinnon, Fairchild, & Fritz, 2007). Therefore, any constituent that attenuated the relation between maternal age and any EA Scale was considered to be a meaningful explanatory variable for that outcome.

Family context determinants—When all significant family context determinants were controlled together, all effects of maternal age attenuated, except for that on Involvement. Among the individual family context constituents, only marital status attenuated the relation between maternal age and Sensitivity, Structuring, and Responsiveness; father presence attenuated the relation for Responsiveness.

Cognitive determinants—When all cognitive determinants were controlled together, the effects of maternal age on all EA Scales attenuated. Results for the individual constituents indicated that only parenting knowledge explained the effects of maternal age on Sensitivity, Structuring, Responsiveness, and Involvement.

Socioemotional determinants—When all significant socioemotional determinants were controlled together, the effects of maternal age attenuated for Sensitivity, Structuring, and Responsiveness, but not Involvement. Among individual socioemotional constituents, maternal Openness attenuated the effect of maternal age on Responsiveness, investment attenuated the effect of maternal age on Structuring and Responsiveness, and satisfaction attenuated the effects of maternal age on Sensitivity, Structuring, and Responsiveness.

Stability of Emotional Availability Scales across Child Age

Table 1 shows moderate stabilities (rs = .25 to .34, ps ≤ .05) for maternal Sensitivity and child Responsiveness and Involvement. Maternal Structuring was not significantly stable.

Discussion

How and Why Do European American Appalachian Mothers of Different Ages Differ in Emotional Relationships with their Children?

Older European American Appalachian mothers were more sensitive and optimally structuring, and their infants and toddlers were more responsive and involving. These results partially support existing literature that suggests that younger mothers exhibit less optimal parenting than do older mothers (Berlin, Brady-Smith, & Brooks-Gunn, 2002). However, our results also qualify general conclusions about adolescent parenting by extending the literature to a carefully recruited sample of rural Appalachian European American dyads. The results also show that, regardless of maternal age, most mothers and children in this community sample fell into adequately functioning ranges of the EA Scales, demonstrating a need to appreciate the resiliency of mothers and babies across a range of personal and social circumstances normally associated with an economically stressed community. Finding significant effects of age treated as a continuous variable reveals that neither “adolescence” nor “adulthood” is a monolithic social address. Continuous linear age effects argue against the popular belief that adolescence represents an undifferentiated source of childrearing risk; rather, “young” mothers constitute a heterogeneous group in themselves. Heterogeneity likely exists among adult mothers too.

These results also point to specific meaningful constituents of age-related heterogeneity in parenting. Among family context constituents, only marital status and father presence in the home explained maternal age effects on dyadic emotional relationships. It may be that marital status and father presence serve to legitimize the mother’s status as parent in her own or others’ eyes. Marital status and father presence may also buffer against life stresses and other difficulties common to communities where financial and other resource strains are common, like Appalachia. Male partners (including fathers) and what they provide during the postpartum period are often critical to the young mother’s well-being (Brown, Goslin, & Feinberg, 2011; de Anda & Becerra, 1984). Mothers who perceive the infant’s father as providing support have better mental and physical health than those who perceive less

support (Cohen & Wills, 1985), and they have infants who fare better (Unger & Wandersman, 1985). Levitt et al. (1986) found that emotional support and childcare from a spouse, but not from other family members, were associated with more positive maternal affect.

Of three cognitive measures, only mothers' specific knowledge of childrearing and child development explained age differences in mother-child emotional relationships. This finding accords with that of a multi-site study of over 800 mothers that indicated that, compared to adults, adolescents have more difficulty mentally conceptualizing parenthood as the complicated and multifaceted task that it is (Benasich & Brooks-Gunn, 1996). The adolescent mother is likely to have been a poorer student (Moore et al., 1993), making it less likely that she will turn to written materials for childrearing knowledge, which older European American middle-class women prize as their primary source of parenting information (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988).

In the socioemotional domain, only maternal Openness and self-perceived investment in and satisfaction with parenting explained relations between maternal age and emotional relationships. Losoya et al. (1997) reported that an open personality is associated with more positive support and less negative control of children. Invested parents are highly committed, view being good parents as important to their self-identity, and sacrifice personal pleasures to be with their children because they believe that they can meet their children's needs (Greenberger & Goldberg, 1989). Younger mothers may be less invested because the demands of the parent role (an intense focus on fostering the growth and development of another person) conflict with the developmental needs of the mother herself (establishing self-esteem, gaining a mature sense of identity and autonomy, and acquiring intimate relationships; Levine et al., 1985), diminishing their ability to accurately perceive or adequately respond to their children. Parenting satisfaction is a less extensively studied construct in the literature. Because it is intimately involved in affective interactions with children (Miller, 1995), however, it merits increased attention. Overall, our findings accord with a family systems view that mother-child relationships are embedded in and moderated by larger family dynamics (Bornstein & Sawyer, 2006), and the findings have explicit implications for how quality of life might be improved in the Appalachian community, a topic we return to at the conclusion of this article.

Continuity and Stability in Emotional Relationships between Infancy and Toddlerhood

As have others (Biringen, Emde, Campos, & Appelbaum, 1995; Biringen et al., 1999; Biringen et al., 2000; Lovas, 2005), we found group-level continuity as well as moderate individual-level stability in some mother and child EA Scales over a 15-month interval. Maternal optimal structuring diminished from 5 to 20 months, reflective perhaps of the increasing challenges mothers confront as their infants grow into toddlers. Structuring the environment and activities of a preverbal prelocomotor infant may be easier than structuring the environment of a young child. The behavior of a young child is often the best barometer of both the history and the present nature of the mother-child relationship. Our data indicating that responsiveness and involvement did not change from 5 to 20 months suggest that positive features of the emotional relationship that had been established between mother and infant during the first year had not fundamentally changed by 2 years. Developmental issues emerge in toddlerhood that require mothers to encourage and support exploration and autonomy-seeking while simultaneously having to set limits, assist the child with emotion regulation, and assure the child's safety (Edwards & Liu, 2002). Developmental challenges to parenting skills seem to eventuate in a (temporary) disequilibrium in maternal structuring behavior.

Limitations

Our longitudinal sample represented a demographically significant and underresearched community population, but it was relatively small and restricted to primiparas. We measured a host of personal, cognitive, and socioemotional characteristics that could affect mother-infant relationships, but we were not able to measure all possible relevant constructs (e.g., depression, parenting stress). Furthermore, fathers were not assessed directly; we relied on mothers' reports of father presence in the home and involvement with and support of the child. These factors constrain the power of the tests and generalizability of the results.

Conclusions and Implications

A growing body of evidence suggests that parent and child mutual emotional relationships relate to their quality of attachment as well as to other key dimensions of child and parent healthy functioning. For families who live in communities like Appalachia that may put them at risk because of rural residence, poverty, or unavailability of resources, the complex tasks of parenting must be performed in the face of multiple challenges that pose threats and compromise optimal caregiving. This circumstance is perhaps especially true for mothers from communities where teen parenthood is also common. Studying the full and feasible age range of mothers in the same multivariate design, as we did here, provides a more complete picture of the role of chronological age in parenting. Future research designed to disentangle the nuanced interactions of genetic, prenatal, family, and environmental risks associated with maternal behavior is needed to elucidate the contributory role of age at first birth to parenting and child development.

Our data also point to a need for research and policy approaches that move away from stereotyping younger or older mothers as single homogeneous "at-risk" populations and towards recognizing diverse linkages of maternal age (*qua* a continuous variable) with parenting and child development. The developmental trajectories and outcomes of younger and older mothers and their children generally show considerable variability, the sources of which still are not well understood (Shapiro & Mangelsdorf, 1994). Additional work is needed to refine our understanding of the pathways by which maternal age at parturition affects parents and children.

The findings we report may also inform the development of more specific interventions tailored for mothers of different ages as well as different communities. The action component of community psychology is grounded in strong empiricism. As targeted interventions are known to improve mother-child sensitivity (Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2007), it is as essential to define which supports are most beneficial for improved childrearing and child development in which mothers from which sociodemographic settings as it is to ensure buy-in and engagement in program interventions, especially where participants may be resource poor (Brown et al., 2011). No one size intervention fits all, as shown by Barrera Jr., Castro, and Steiker (2011) who analyzed preventative interventions targeted at subcultural groups. Their analysis of diverse approaches echoed the Institute of Medicine report (O'Connell, Boat, & Warner, 2009) that recommended that interventions that successfully adopt and integrate cultural mazeways would experience the likeliest successes with both consumers and community agents. Thus, intervention development should start with the subcultural group and any community organizations that serve it (see Falicov, 2009, for an example), and sensitivity to such subcultural adaptations promise to improve engagement and acceptability of interventions in local communities. Our data indicate that for Appalachian mothers, having a committed partner can enhance mother-child emotional relationships. Thus, switching the focus from an age-based to a resource-based model may improve identification of those mothers who would benefit most from intervention. Instead of flagging all teen mothers for intervention,

our study suggests that rural mothers who do not have a committed coresident partner, who have a low level of parenting knowledge, and who report less investment and satisfaction with parenting may be most at risk for disrupted mother-child emotional relationships. Hence, interventions targeted at improving mothers' knowledge of childrearing and child development as well as increasing their investment in and satisfaction with parenting, might minimize dysfunctional exchanges in mother-child dyads. Finally, additional investigations of the personal resources of rural Appalachian mothers may clarify how it is that some successfully negotiate the challenging tasks of parenthood under conditions of adversity while others falter.

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References

Abramson, R.; Haskell, J., editors. Encyclopedia of Appalachia. University of Tennessee Press; Knoxville, TN: 2006.

Atwater, J.; Lefever, JB.; Guest, K.; Selig, J.; Keener, L.; Weaver, C.; the Centers for Prevention of Child Neglect. Becoming a parent for the first time; Poster presented at Head Start's 8th National Research Conference; Washington, D.C. 2006, June;

Barrera M, Castro FG, Steijer LKH. American Journal of Community Psychology. 2011 Advance online publicication. doi: 10.1007/s10464-010-9422-x.

Benasich AA, Brooks-Gunn J. Maternal attitudes and knowledge of child-rearing: Associations with family and child outcomes. Child Development. 1996; 67:1186–1205. [PubMed: 8706517]

Berlin LJ, Brady-Smith C, Brooks-Gunn J. Links between childbearing age and observed maternal behaviors with 14-month-olds in the Early Head Start Research and Evaluation Project. Infant Mental Health Journal. 2002; 23:104–129.

Biringen, Z. The universal language of love. EA Press; Colorado: 2009.

Biringen Z, Emde R, Brown D, Lowe L, Myers S, Nelson D. Emotional availability and emotion communication in naturalistic mother-infant interactions: Evidence for gender relations. Journal of Social Behavior and Personality. 1999; 14:463–478.

Biringen Z, Emde RN, Campos JJ, Appelbaum MI. Affective reorganization in the infant, the mother, and the dyad: The role of upright locomotion and its timing. Child Development. 1995; 66:499–514. [PubMed: 7750380]

Biringen Z, Matheny A, Bretherton I, Renouf A, Sherman M. Maternal representation of the self as parent: Connections with maternal sensitivity and maternal structuring. Attachment & Human Development. 2000; 2:218–232. [PubMed: 11707912]

Biringen, Z.; Robinson, JL.; Emde, RN. Emotional Availability Scales. 3rd ed.. Colorado State University; Fort Collins, CO: 1998. Unpublished manual

Bornstein, MH.; Bornstein, L. Psychological stability. In: Darity, WA., Jr., editor. International Encyclopedia of Social Sciences. 2nd ed.. Vol. 8. Macmillan Reference; Detroit, MI: 2008. p. 74-75.

Bornstein MH, Putnick DL. Chronological age, cognitions, and practices in European American mothers: A multivariate study of parenting. Developmental Psychology. 2007; 43:850–864. [PubMed: 17605519]

Bornstein MH, Putnick DL, Suwalsky JTD, Gini M. Maternal chronological age, prenatal and perinatal history, social support, and parenting of infants. Child Development. 2006; 77:875–892. [PubMed: 16942495]

Bornstein, MH.; Sawyer, J. Family systems. In: McCartney, K.; Phillips, D., editors. Blackwell handbook on early childhood development. Blackwell; Malden, MA: 2006. p. 381-398.

Bornstein MH, Suwalsky JTD, Breakstone DA. Emotional relationships between mothers and infants: Knowns, unknowns, and unknown unknowns. Development and Psychopathology. 2012

Bronfenbrenner, U.; Morris, PA. The bioecological model of human development. In: Lerner, RM., editor. Theoretical models of human development. Volume 1 of Handbook of Child Psychology. 6th ed.. Wiley; Hoboken, NJ: 2006. p. 793-828.

Brown LD, Goslin MC, Feinberg ME. Relating engagement to outcomes in prevention: The case of a parenting program for couples. American Journal of Community Psychology. 2011 Advance online publication. doi: 10.1007/s10464-011-9467-5.

Bugental, DB.; Happaney, K. Parental attributions. In: Bornstein, MH., editor. Handbook of parenting. 2nd ed. Vol. 3. Erlbaum; Mahwah, NJ: 2002. p. 509-535.

Chase-Lansdale PL, Brooks-Gunn J, Zamsky E. Young African-American multigenerational families in poverty: Quality of mothering and grandmothering. Child Development. 1994; 65:373–393. [PubMed: 8013228]

Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. Psychological Bulletin. 1985; 98:310–357. [PubMed: 3901065]

Coleman PK, Karraker KH. Self-efficacy and parenting quality: Findings and future applications. Developmental Review. 1998; 18:47–85.

Coley RL, Chase-Lansdale PL. Adolescent pregnancy and parenthood: Recent evidence and future directions. American Psychologist. 1998; 53:152–166. [PubMed: 9491745]

Crockenberg SB. Predictors and correlates of anger toward and punitive control of toddlers by adolescent mothers. Child Development. 1987; 58:964–975. [PubMed: 3608666]

de Anda D, Becerra RM. Social support networks for adolescent mothers. Journal of Social Casework. 1984; 65:172–181.

Deutsch FM, Ruble DN, Fleming A, Brooks-Gunn J, Stangor C. Information-seeking and maternal self-definition during the transition to motherhood. Journal of Personality and Social Psychology. 1988; 55:420–431. [PubMed: 3171914]

Dunn, LM.; Dunn, LM. Peabody picture vocabulary test-revised manual. American Guidance Service; Circle Pines, MN: 1981.

Edwards, CP.; Liu, W-L. Parenting toddlers. In: Bornstein, MH., editor. Handbook of parenting, Vol. 1: Children and parenting. 2nd ed.. Erlbaum; Mahwah, NJ: 2002. p. 45-71.

Falicov CJ. Commentary: On the wisdom and challenges of culturally attuned treatments for Latinos. Family Process. 2009; 48:292–309. [PubMed: 19579910]

Fergusson DM, Woodward LJ. Maternal age and educational and psychosocial outcomes in early adulthood. Journal of Child Psychology and Psychiatry. 1999; 43:479–489. [PubMed: 10190348]

Field TM, Widmayer SM, Stringer S, Ignatoff E. Teenage, lower-class, black mothers and their preterm infants: An intervention and developmental follow-up. Child Development. 1980; 51:426–436. [PubMed: 7398450]

Fish M, Amerikaner MJ, Lucas CJ. Parenting preschoolers in rural Appalachia: Measuring attitudes and behaviors and their relations to child development. Parenting: Science and Practice. 2007; 7:205–233.

Fish M, Stifter CA. Parenting attitudes and behaviors in rural Appalachian mothers: A comparison study. Journal of Rural Community Psychology. 1999; E2(1)

Garrett P, Ferron J, Ng'andu N, Bryant D, Harbin G. A structural model for the developmental status of young children. Journal of Marriage and the Family. 1994; 56:147–163.

Gee CB, Rhodes JE. Postpartum transitions in adolescent mothers' romantic and maternal relationships. Merrill-Palmer Quarterly. 1999; 45:512–532.

Greenberger E, Goldberg W. Work, parenting, and the socialization of children. Developmental Psychology. 1989; 25:22–35.

Harrington, M. The Other America: Poverty in the United States. Macmillan; New York: 1962.

Hartmann, DP.; Pelzel, K.; Abbott, CB. Design, measurement, and analysis in developmental research. In: Bornstein, MH.; Lamb, ME., editors. Developmental psychology: An advanced textbook. 6th ed.. Psychology Press; New York: 2011.

Havighurst, RJ. Developmental tasks and education. 3rd ed.. David McKay; New York: 1972.

Hofferth, SL. The children of teen childbearers. In: Hofferth, SL.; Hayes, CD., editors. Risking the future. National Academy Press; Washington, DC: 1987. p. 174-206.

Hollingshead, AB. Four factor index of social status. Yale Station; New Haven, CT: 1975. p. 06520P.O. Box 1965

Jackson, DN. Jackson personality inventory manual. Research Press; Goshen, NY: 1976.

Juffer, F.; Bakermans-Kranenburg, MJ.; van IJzendoorn, MH., editors. Promoting positive parenting. Erlbaum; Mahwah, NJ: 2007.

Levine L, Garcia-Coll CT, Oh W. Determinants of mother-infant interaction in adolescent mothers. Pediatrics. 1985; 75:23–29. [PubMed: 3966042]

Levitt MJ, Weber RA, Clark MC. Social network relationships as sources of maternal support and well-being. Developmental Psychology. 1986; 22:310–316.

Looff, DH. Appalachia's children. The University Press of Kentucky; Lexington, KY: 1971.

Losoya SH, Callor S, Rowe DC, Goldsmith HH. Origins of familial similarity in parenting: A study of twins and adoptive siblings. Developmental Psychology. 1997; 33:1012–1023. [PubMed: 9383623]

Lovas GS. Gender and patterns of emotional availability in mother-toddler and father-toddler dyads. Infant Mental Health Journal. 2005; 26:327–353.

Luker, K. Dubious conceptions. Harvard University Press; Cambridge, MA: 1997.

MacCallum RC, Zhang S, Preacher KL, Rucker DD. On the practice of dichotomization of quantitative variables. Psychological Methods. 2002; 7:19–40. [PubMed: 11928888]

MacKinnon DP, Fairchild AJ, Fritz MS. Mediation analysis. Annual Review of Psychology. 2007; 58:593–614.

MacPhee, D. Manual: Knowledge of infant development inventory. University of North Carolina; 1981. Unpublished manuscript

MacPhee, D.; Benson, JB.; Bullock, D. Influences on maternal self-perceptions; Paper presented at the Fifth Biennial International Conference on Infant Studies; Los Angeles. 1986;

McGraw KO, Wong SP. Forming inferences about some intraclass correlation coefficients. Psychological Methods. 1996; 1:30–46.

McLoyd, VC.; Aikens, NL.; Burton, LM. Childhood poverty, policy, and practice. In: Renninger, KA.; Sigel, IE., editors. Handbook of child psychology: Vol. 4. Child psychology in practice. 6th ed.. Wiley; Hoboken, NJ: 2006. p. 700-775.

Mercer RT, Hackley KV, Bostrom A. Social support of teenage mothers. Birth Defects: Original Article Series. 1984; 20:245–290. [PubMed: 6536336]

Miller S. Parents' attributions for their children's behavior. Child Development. 1995; 66:1557–1584. [PubMed: 8556886]

Mirowsky J. Parenthood and health: The pivotal and optimal age at first birth. Social Forces. 2002; 81:315–349.

Moore KA, Myers DE, Morrison DR, Nord CW, Brown B, Edmonston B. Age at first childbirth and later poverty. Journal of Research on Adolescence. 1993; 3:393–422. [PubMed: 12319701]

National Center for Children in Poverty. [Accessed online, August 1, 2011] 50-state data: Income status of children under age 18, by race. 2010. http://www.nccp.org/tools/table.php?db=dem&data=per&state=&ids=45,46,47,48,49&states=&title=50-State%20Data&age=18&unit=Children&inc=Poor&denom=char&cat=11

O'Connell, ME.; Boat, T.; Warner, KE. Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities. Institute of Medicine, National Research Council; Washington, DC: 2009.

Paunonen SV, Jackson DN. The Jackson Personality Inventory and the five-factor model of personality. Journal of Research in Personality. 1996; 30:2–59.

Roberts BW, Walton KE, Viechtbauer W. Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. Psychological Bulletin. 2006; 132:1–25. [PubMed: 16435954]

Shapiro JR, Mangelsdorf SC. The determinants of parenting competence in adolescent mothers. Journal of Youth and Adolescence. 1994; 23:621–641. [PubMed: 12346482]

Sigel, IE.; McGillicuddy-De, Lisi. Parental beliefs and cognitions: The dynamic belief systems model. In: Bornstein, MH., editor. Handbook of parenting. 2nd ed.. Vol. 3. Erlbaum; Mahwah, NJ: 2002. p. 485-508.

Simons RL, Johnson C, Conger RD, Lorenz RO. Linking community context to quality of parenting: A study of rural families. Rural Sociology. 1997; 62:207–223.

Sirignano SW, Lachman ME. Personality change during the transition to parenthood: The role of perceived infant temperament. Child Development. 1985; 21:558–567.

Soenens B, Vansteenkiste M, Luyckx K, Goossens L. Parenting and adolescent problem behavior: An integrated model with adolescent self-disclosure and perceived parental knowledge as intervening variables. Developmental Psychology. 2006; 42:305–318. [PubMed: 16569169]

Sommer K, Whitman TL, Borkowski JG, Schellenbach C, Maxwell S, Keogh D. Cognitive readiness and adolescent parenting. Developmental Psychology. 1993; 29:389–398.

Steinberg LD, Catalano R, Dooley D. Economic antecedents of child abuse and neglect. Child Development. 1981; 52:975–985. [PubMed: 7285664]

Unger D, Wandersman L. Social support and adolescent mothers: Action research contributions to theory and application. Journal of Social Issues. 1985; 41:29–45.

U.S. Department of Commerce. LandView® III environmental mapping software. U.S. Census Bureau; Atlanta, GA: 1997.

USDA Economic Research Service. [Accessed online, August 1, 2011] West Virginia State Fact Sheet: Population, Income, Education, and Employment. 2010. http://www.ers.usda.gov/StateFacts/WV.htm

Wallace, D.; Green, SB. Analysis of repeated measures designs with linear mixed models. In: Moskowitz, DS.; Hershberger, SL., editors. Modeling intraindividual variability with repeated measures data. Erlbaum; Mahwah, NJ: 2002. p. 103-134.

Weiner, B.; Frieze, I.; Kukla, A.; Reed, L.; Rest, S.; Rossenbaum, RM. Perceiving the causes of success and failure. In: Jones, EE., et al., editors. Attribution: Perceiving the causes of behavior. General Learning Press; Morristown, NJ: 1972. p. 95-120.

West Virginia Kids Count Fund. [Accessed online on October 25, 2011] West Virginia: Teen Birth Rate (ages 15-19 per 1,000 females; Rate) - 2008. 2009. from http://datacenter.kidscount.org/data/bystate/Rankings.aspx?state=WV&loct=5&by=v&order=a&ind=5087&dtm=11519&tf=35

Whitman, TL.; Borkowski, JG.; Keogh, DA.; Weed, K. Interwoven lives: Adolescent mothers and their children. Erlbaum; Mahwah, NJ: 2001.

Williams, JA. [Accessed on October 25, 2011] Appalachia: A History. 2002. from http://www.questia.com/PM.qst?a=o&d=101424403

Table 1

Descriptive Statistics of the Emotional Availability Scales by Child Age, Correlations with Maternal Age, and Stability Coefficients from 5 to 20 Months

	5 months				*20 months*				$r_{5\text{-}20}$	95% CI
	M	***SD***	r_{age}	**95% CI**	***M***	***SD***	r_{age}	**95% CI**		
Mother										
Sensitivity (1-9)[a]	6.09	1.33	42***	.19–.62	5.77	1.25	.24	−.02–.47	.34**	.09–.55
Structuring (1-5)	4.10	.72	.31*	.06–.53	3.61	.69	.07	−.19–.33	.10	−.16–.35
Child										
Responsiveness (1-7)	4.92	1.02	.28*	.03–.50	4.84	.89	.23	−.03–.46	.28*	.02–.50
Involvement (1-7)	5.00	.96	.33*	.07–.54	4.81	.89	.34**	.09–.55	.25*	.00–.48

Note. r_{age} = Correlation with maternal age. $r_{5\text{-}20}$ = Stability coefficient from 5 to 20 months.

[a]Possible range.

Table 2

Descriptive Statistics and Correlations of Family Context, Cognitive, and Socioemotional Explanatory Determinants with the Emotional Availability Scales

			Sensitivity		Structuring		Responsiveness		Involvement	
	M	*SD*	*r*	95% CI	r	95% CI	*r*	95% CI	r	95% CI
Family Context Determinants										
Father support	3.07	1.37	.01	−.17–.19	−.04	−.22–.15	.02	−.16–.20	−.02	−.20–.16
Extended family support	2.31	.90	−.28**	−.44–−.10	−.12	−.29–.06	−.17	−.35–.01	−.11	−.29–.07
% married[a]	65.52		.36***	.19–.51	.23*	.05–.40	.30***	.13–.46	.29**	.11–.44
% father in home[a]	79.31		.27**	.09–.43	.15	−.03–.33	.22*	.04–.39	.21*	.03–.38
Father involvement	3.08	.96	.05	−.13–.24	−.05	−.23–.14	.07	−.12–.25	.06	−.13–.24
Father interaction	3.76	.84	.15	−.05–.34	.15	−.05–.34	.26**	.06–.43	.25*	.06–.43
Extended family in home	.90	1.76	−.23*	−.39–−.05	−.05	−.23–.13	−.16	−.33–.03	−.13	−.31–.05
Hours of work	16.96	17.82	.02	−.17–.20	.02	−.16–.20	.06	−.13–.23	.10	−.08–.28
Cognitive Determinants										
Verbal intelligence	96.40	19.26	.12	−.06–.30	.08	−.11–.26	.19*	.01–.36	.19*	.01–.36
Education	4.16	1.31	.26**	.08–.42	.14	−.05–.31	.15	−.03–.32	.23*	.05–.40
Parenting knowledge	.75	.11	.38***	.20–.53	.27**	.08–.44	.32***	.14–.49	.33***	.15–.49
Socioemotional Determinants										
Personality										
Openness	.00	1.00	.24*	.05–.41	.16	−.03–.34	.21*	.02–.39	.19	−.01–.36
Neuroticism	.00	1.00	−.08	−.26–.12	−.01	−.20–.18	−.06	−.24–.14	−.04	−.23–.16
Extraversion	.00	1.00	−.04	−.23–.16	.01	−.18–.20	.03	−.17–.22	.08	−.12–.26
Conscientious	53.51	9.64	.19	−.00–.36	.01	−.18–.20	.14	−.05–.32	.12	−.07–.31
Trustworthiness	55.47	7.92	.30**	. 11–.46	.17	−.02–.35	.22*	.03–.39	.20*	.01–.38
Self-perceptions of parenting										
Competence	4.11	.64	.21*	.01–.39	.15	−.05–.34	.13	−.07–.31	.08	−.11–.28
Investment	3.22	.79	.32***	.14–.49	.21*	.02–.39	.28**	.09–.45	.15	−.05–.33

			Sensitivity		Structuring		Responsiveness		Involvement	
	M	***SD***	***r***	**95% CI**	**r**	**95% CI**	***r***	**95% CI**	**r**	**95% CI**
Satisfaction	4.42	.67	.39***	.21–.54	.27**	.07–.44	.31**	.12–.47	.24*	.05–.42
Role balance	3.82	.69	.25*	.05–.43	.16	−.04–.35	.20*	.00–.38	.14	−.06–.33
Parenting attributions										
IAF	13.47	4.71	.07	−.16–.29	.14	−.08–.36	−.03	−.25–.20	.05	−.18–.27
EAF	18.05	4.35	−.08	−.30–.15	.10	−.13–.32	.01	−.22–.23	−.02	−.24–.21
IAS	19.50	5.53	−.04	−.26–.19	−.01	−.23–.22	−.07	−.29–.16	.05	−.18–.28
EAS	24.30	4.47	−.02	−.24–.21	.05	−.18–.27	.05	−.18–.28	.04	−.19–.27

Note. IAF = Internal attributions of failure. EAF = External attributions of failure. IAS = Internal attributions of success. EAS = External attributions of success.

[a]Point-biserial correlations.

*$p < .05$.

**$p < .01$.

***$p < .001$.

Table 3

Baseline Linear Mixed Models and Models Controlling Family Context, Cognitive, and Socioemotional Determinants in Blocks and Singly

	Sensitivity	Structuring	Responsiveness	Involvement
Baseline Models				
Child age by Maternal age	2.08	2.04	.22	.04
Child age	3.51	17.50***	.52	2.01
Maternal age	11.38***	4.35*	6.59*	11.83***
Maternal Age Controlling Family Context Determinants				
All family context	.44	.19	.92	4.07*
Extended family support	6.01*	--	--	--
Marital status	1.96	.19	1.00	4.30*
Father presence	5.45*	--	2.97	7.66**
Father social interaction with child	--	--	4.29*	7.43**
Extended family in home	7.22**	--	--	--
Maternal Age Controlling Cognitive Determinants				
All cognitive	.41	.01	.19	2.25
Verbal intelligence	--	--	4.70*	9.35***
Education	4.62*	--	--	5.88*
Parenting knowledge	.42	.01	.22	2.33
Maternal Age Controlling Socioemotional Determinants				
All socioemotional	2.85	.34	1.52	5.58*
Openness	6.53*	--	3.85	--
Trustworthiness	6.72*	--	4.17*	8.83**
Competence	7.14**	--	--	--
Investment	7.23**	1.76	3.83	--
Satisfaction	3.74	.58	1.98	6.77*
Role Balance	8.14**	--	5.00*	--

Note. F statistics. The *dfs* for the baseline models are $F(1, 56)$, and for the covariate-controlled models range from $F(1, 46)$ to $F(1, 69.18)$. -- = covariate was not controlled because it was not significantly associated with the dependent variable.

* $p < .05$.

** $p < .01$.

*** $p < .001$.