

Infant–Mother Attachment Classification: Risk and Protection in Relation to Changing Maternal Caregiving Quality

NICHD Early Child Care Research Network

The relations between early infant–mother attachment and children’s social competence and behavior problems during the preschool and early school-age period were examined in more than 1,000 children under conditions of decreasing, stable, and increasing maternal parenting quality. Infants’ Strange Situation attachment classifications predicted mothers’ reports of children’s social competence and teachers’ reports of externalizing and internalizing behaviors from preschool age through 1st grade. These relations appeared to be mediated by parenting quality; main effects of attachment classification disappeared when effects of parenting quality were controlled. Interactions were also observed. For example, when parenting quality improved over time, teachers rated children with insecure infant–mother attachments lower on externalizing behaviors; when parenting quality decreased, teachers rated insecure children higher on externalizing behaviors. In contrast, children classified as securely attached in infancy did not appear to be affected by declining or improving parenting quality.

Keywords: early attachment security, risks and protection, behavior problems in preschoolers, maternal sensitivity, continuity from infancy to preschool

Over the last decade, studies of the continuing effects of early attachment under changing environmental conditions have attracted increasing interest because of the central role attachment theory plays in developmental psychopathology (Sroufe, Carlson, Levy, & Egeland, 1999). Attachment theory identifies particular developmental pathways toward psychosocial adjustment. These pathways emerge out of early parent–caregiver relationships (Carlson & Sroufe, 1995; Sroufe, 1990) and have their origins in the child’s early attachment organization. A theory of process,

attachment theory posits that children’s early experiences with their caregivers create the lenses through which children interpret and make sense of subsequent experiences. Attachment theorists acknowledge that change is possible at each phase of development, but they also assert that “change is constrained by prior adaptations, and alterations in some forms of adaptation may be more likely for certain individuals” (Carlson & Sroufe, 1995, p. 582).

In this report, we examine the continuities and discontinuities between patterns of infant–mother attachment and children’s social adjustment and externalizing and internalizing problems when children transition to formal schooling. Do children’s attachment classifications in infancy predict social competence and behavior problems in subsequent developmental periods? If so, is this continuity mediated by continuity of parenting quality over time? Do the effects of early attachment organizations persist if the quality of maternal parenting changes? Are the effects of changes in caregiving conditions moderated by the child’s initial attachment organization? Answering these questions will help researchers better understand and predict the conditions under which early attachment has long-term effects on children’s social adjustment and behavior.

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Correspondence concerning this article should be addressed to NICHD Early Child Care Research Network, NICHD, 6100 Executive Boulevard, Room 4B05, Rockville, MD 20852.

Predicting Later Social Competence From Early Attachment Classification

Attachment researchers have identified four patterns of adaptation that emerge during early infant–parent relationships. In the secure pattern of attachment (B), an infant readily separates from an attentive, available caregiver, using the caregiver as a secure base for exploration (Ainsworth, Blehar, Waters, & Wall, 1978). Securely attached children explore confidently in the presence of the caregiver, express their emotions directly to others, and actively seek help from others when they are unable to help themselves (Sroufe, Fox, & Pancake, 1983). Their openness to their own emotions and to the overtures of others is thought to help them regulate their emotions and emotional responsiveness and

adapt creatively and successfully to changing circumstances and new challenges. These skills may help children with histories of secure attachment form healthy and stable peer relationships in preschool and early childhood (Carlson & Sroufe, 1995).

Because early caregivers have either ignored or rejected their signals, children with avoidant attachment histories (A) come to see their caregivers as unavailable and unresponsive. Avoidant infants learn to inhibit emotional signals, especially negative ones; in time, they may inhibit emotions and avoid emotionally charged situations. As a result, negative emotions—particularly distress and anger—may become redirected toward inappropriate sources. In preschool and early-childhood periods, these children may have difficulty expressing their negative feelings toward adults and peers adaptively. Prone to minimize their feelings, these children may develop idealized beliefs about others, and they may have difficulty controlling their anger. Such limitations are likely to predispose children toward increased risk for later externalizing and internalizing behavioral problems, and they may lead to difficulties in social situations and problems in developing friendships (Carlson & Sroufe, 1995; Cassidy & Kobak, 1988; Kobak & Sceery, 1988).

As a result of interactions with caregivers who are not consistently available or responsive, infants with the anxious-resistant pattern (C) are expected to become chronically vigilant toward caregiver activity and may show exaggerated expressions of distress to elicit caregiver attention (Carlson & Sroufe, 1995). In preschool and early childhood, these children may be easily frustrated, impulsive, and overly anxious, sometimes seeing themselves as unworthy and helpless to cope with distress (Bowlby, 1980). Children with anxious-resistant attachments are likely to have reduced exploration in unfamiliar settings and increased preoccupation with personal suffering, heightened personal fears, and elevated psychosomatic symptoms. They may be either inappropriately aggressive or excessively passive and prone to internalizing behavior problems (Carlson & Sroufe, 1995).

Finally, children with disorganized patterns (D) of early attachment, about whom less is known, show no clear organized attachment strategy in infancy and respond to their mothers in the Strange Situation with a variety of contradictory behavior patterns, odd or mistimed movements, or disorientation (Cassidy & Mohr, 2001). In contrast to other insecure infants, infants classified as having disorganized attachment may be at a greater risk for psychopathology in childhood (Greenberg, 1999). Researchers have identified greater incidence of increased aggression, externalizing disorders, and oppositional defiant disorder in these children (Lyons-Ruth & Jacobvitz, 1999; van IJzendoorn, Schuengel & Bakermans-Kranenburg, 1999).

How does the quality of early attachment relationships affect later development? In the following sections, we examine three of the many possible models that describe how early attachment might affect subsequent psychological adjustment. In presenting these extreme and somewhat simplistic models, we hope to clarify some of the possible processes underlying the continuing effects of early attachment.

The Extreme Early Effects Model

The simplest model of understanding the continuing effects of early attachment might be labeled the *extreme early effects model*.

In this main effect model, early attachment predicts later development regardless of later environmental change. A number of studies, particularly those from the Minnesota group of researchers (e.g., Arend, Gove, & Sroufe, 1979; Erickson, Sroufe, & Egeland, 1985; Sroufe, Egeland, & Kreutzer, 1990; Urban, Carlson, Egeland, & Sroufe, 1991) as well as others (Barglow, Contreras, Kavesh, & Vaughn, 1998; Bretherton, Ridgeway, & Cassidy, 1990; Cassidy, 1988; Greenberg, Speltz, DeKlyen, & Endriga, 1991; Lütkenhaus, Grossman, & Grossman, 1985; Shaw & Vondra, 1995) have demonstrated continuity from infant attachment to later play activity, emotional regulation, and peer relations in preschool, middle childhood, and even adolescence. A meta-analysis of 63 studies examining relations between child–parent attachment and children’s peer relations produced an effect size in the small-to-moderate range (Schneider, Atkinson, & Tardif, 2000).

More recent studies have also illustrated this continuity. Studying 3-year-old children, McElwain, Cox, Burchinal, and Macfie (2003) reported that a history of avoidant attachment was related to instrumental aggression during child–friend interactions; a history of anxious-resistant attachment was related to less self-assertion among friends. Following a sample of children of adolescent mothers from 12 months to 9 years of age, Munson, McMahon, and Spieker (2001) found that children with histories of either avoidant or disorganized attachments showed higher levels of externalizing problems at age 9 compared with children with secure attachment histories. Lyons-Ruth, Easterbrooks, and Cibelli (1997) found that infants with either avoidant or disorganized histories were rated high on both internalizing and externalizing symptoms at age 7 compared with children with secure attachment histories. Some evidence suggests that greater risks to adaptation are incurred by children with insecure–disorganized attachment than by children with avoidant or anxious-resistant attachments (Carlson, 1998; Lyons-Ruth, Alpern, & Repacholi, 1993; Shaw, Owens, Vondra, & Keenan, 1996).

Nevertheless, relations across time are not always strong and are not routinely documented, particularly in the normal range of behaviors (Belsky & Fearon, 2002a; Erickson, Sroufe, & Egeland, 1985; Lewis, Feiring, & Rosenthal, 2000). Lewis, Feiring, McGuffog, & Jaskir (1984) showed that early attachment insecurity predicted problem behaviors in first grade for boys only; Suess, Grossman, and Sroufe (1992) found that attachment predicted 5-year-old outcomes only for girls and only for children with early avoidant attachment. Attachment theorists and researchers acknowledge that not all infants who are insecurely attached develop problems later and that when they do, these relations appear to be associated with environmental continuity (Carlson & Sroufe, 1995). Indeed, many of the studies that have shown meaningful associations between early infant–mother attachment security and later social outcomes have come from researchers studying low-income, high-risk families in which stress and unresponsive environments are more likely to be self-perpetuating.

Environmental Changes and Lawful Discontinuity

Contradictory results have challenged researchers to search for *lawful discontinuity*. According to Belsky, Fish, and Isabella (1991), the search for lawful discontinuity is the search for situations in which it proves possible to predict when earlier measure-

ments of children's functioning will and will not predict later developmental outcomes that they might typically be expected to forecast. Environmental continuity plays a central role in the continuity of individual adaptation (Lewis et al., 2000; Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998), with a number of studies demonstrating that the child's concurrent or recent experience is often a better predictor of subsequent functioning than is early attachment (for discussion and reviews, see Lewis, 1997; Thompson, 1999). Under what conditions will attachment history be predictive of later functioning, and under what conditions will it not?

Lewis et al. (2000) noted two types of continuity related to attachment and the predictability of environmental effects—continuity associated with the stability or instability of environmental conditions and continuity attributable to predictable differences in the way children with differing attachment histories respond to environmental changes (Lewis et al., 2000). The first type of continuity gives rise to what we might call the *mediating experiences* model, and the second gives rise to what might be called the *dynamic interactive* model.

The Mediating Experiences Model

Early attachment theory critics questioned whether it was early attachment organization or environmental continuity that was ultimately responsible for the continuity attributed to early attachment relationships (Lamb & Bornstein, 1982, 1987; Maccoby, 1980). To quote Maccoby (1980),

children who were securely attached at twelve or fifteen months probably were receiving sensitive, responsive mothering at that age and probably were continuing to receive the same kind of mothering as they grew older. The mothers of these children probably continued to respect their autonomy and support their efforts to cope independently with their new experiences, while standing ready to give direct help when needed. Thus, the well-adjusted social behavior of these children at three-and-a-half might reflect the current healthy state of the parent-child relationship, rather than being an outcome of the relationship that existed two years earlier. (p. 102)

As several studies demonstrated, when a child's environment changed, the child's attachment organization was also more likely to change (Belsky et al., 1991; Thompson & Lamb, 1983; Vaughn, Egeland, Sroufe, & Waters, 1979; see also Lewis et al., 2000). This model would lead to the hypothesis that it is not the child's early attachment organization that is responsible for the prediction to subsequent behavior but the parents' behaviors associated with the earlier attachment organization—particularly those that are concurrent with the later measured outcomes—that are responsible for any continuity that is observed.

Attachment as a Dynamic Process

Less frequently examined is the idea from attachment theory that attachment is a dynamic process (Bowlby, 1969, 1973, 1980). Early attachment organizations and their concomitant internal working models are thought to affect how children perceive and interpret relationships and events in their lives (Carlson & Sroufe, 1995; Cassidy & Mohr, 2001). Hypotheses deriving from this model would predict that children with differing attachment his-

stories interpret and respond to changing environmental conditions in different ways.

Several studies have examined the effects of internal working models on children's perceptions of social events. Belsky, Spritz, and Crnic (1996) demonstrated that 3-year-old boys with secure attachment histories at 12 months remembered positive events presented during a puppet show more accurately than they remembered negative events; the reverse was true of boys with insecure attachment histories. Booth, Rubin, and Rose-Krasnor (1998) showed that preschool attachment security predicted age-8 perceptions of maternal support better than the mother's actual behavior at age 8. Thus, there are reasons to believe, both theoretically and empirically, that although early attachment may not necessarily inoculate children against changes in environmental conditions (Waters, Posada, Crowell, & Lay, 1993), early attachment organization may affect how children perceive and interpret changing environmental conditions.

The interactive, dynamic model of attachment suggests how children with different attachment organizations might respond differently to environmental changes that affect changes in the caregivers' responsiveness. Less likely to interpret negative events and experiences as feedback on their own selves, securely attached children may be able to reach out to adults other than their primary caregivers for support and assistance. Able to express their emotions directly, these children may be less likely to act out in the form of hostility toward themselves, their attachment figure, or others. In this way, securely attached infants may be protected should parental responsiveness and parenting support decline.

Because avoidantly attached infants are not used to acknowledging and expressing anger to their caregivers, the anger they may feel when their caregivers become increasingly more insensitive and unresponsive may be displaced toward peers and other adults and be expressed in externalizing and internalizing problems. In contrast, when their caregivers become more sensitive and responsive, anger toward others may recede, and behavior toward others may come to resemble that of securely attached infants. Although ambivalently attached children are vigilant from an early age toward caregiver behaviors, it may take a longer period of time for them to respond to the changes because of the previous unpredictability of these behaviors. The responses of children with early attachment disorganization are more difficult to predict.

Providing Empirical Evidence

Untangling lawful discontinuities poses research challenges. Longitudinal measurement is critical; measurement of infant-mother attachment security and repeated measures of parenting over time and child outcome are required. To investigate the effects of each of the major infant-mother attachment classifications, a sufficiently large sample of mothers and children must be followed to assure that adequate numbers of children with the relatively less frequent classifications of attachment can be followed. And multiple child outcomes must be studied, because the relative effects of early attachment security and maternal style may differ depending on the nature of the child outcomes under study (Booth, Rose-Krasnor, McKinnon, & Rubin, 1994). These requirements are met by the NICHD Study of Early Child Care.

The NICHD Study of Early Child Care (NICHD SECC) was begun in the early 1990s to examine whether experiences in

nonmaternal child-care settings are associated with children's development. Researchers measured infant–mother attachment when infants were 15 months of age and repeatedly measured mother–child interaction and a variety of socioemotional and problem-behavior outcomes at subsequent ages in preschool and middle childhood. As a result, the NICHD SECC is uniquely positioned to address questions of development that require longitudinal measurement. With a large and diverse sample of families from 10 different locations across the United States, the data set is ideal for examining the consequences of early attachment in relation to both continuity and change in the quality of parenting.

Several questions have already been addressed using NICHD SECC data. In 1997, NICHD Early Child Care Research Network researchers reported that children were more likely to be classified as insecure when maternal sensitivity was low and at least one of the following conditions was also met: quality of child care was low, children experienced more than 10 hr of care per week, and children experienced more than one child-care arrangement across their first 15 months of life (NICHD Early Child Care Research Network [ECCRN], 1997). In that report, the researchers also identified maternal sensitivity as the variable most predictive of early child security at 15 months of age. In 2001, ECCRN researchers reported that maternal sensitivity was also the strongest predictor of preschool attachment classification, with moderate stability in attachment classification from 15 to 36 months, especially for children with insecure–avoidant or insecure–resistant classifications (NICHD ECCRN, 2001).

Relations between early attachment organization and child outcomes in the child's first 3 years have been examined with NICHD SECC data. McElwain et al. (2003) found that avoidant attachment history was related to more instrumental aggression during child–friend interaction, and resistant attachment history was associated with less self-control and assertion among friends even when maternal sensitivity and concurrent attachment were considered. Maternal sensitivity also made a unique contribution to the prediction of child outcomes at 36 months. Belsky and Fearon (2002a) found that the effects of early attachment organization on children's 3-year functioning were dependent on the quality of mothering experienced by the children at 24 months of age. Among children who experienced a mixed attachment and sensitivity history, better outcomes were observed when an insecure attachment was followed by high maternal sensitivity than when a secure attachment was followed by low maternal sensitivity. Belsky and Fearon (2002b) showed that the effects of early attachment organization varied as a function of social–contextual risk, with insecure–avoidant infants most vulnerable to contextual risk. Most recently, controlling for maternal sensitivity over time, McCartney, Owen, Booth, Clarke-Stewart, and Vandell (2003) found significant associations between behavior problems and attachment at 24 and 36 months but not with 15-month measures of attachment.

In this report, we examine the relations between infant attachment classifications at 15 months, maternal caregiving, and child social–emotional outcomes during the transition to school, from age 4½ through first grade. We look at social competence and behavior problems as reported by mothers, care providers, and teachers, controlling for demographic variables that might confound relations with attachment, child outcome, and parenting.

We address three specific sets of questions that test the three models of the continuing effects of early attachment detailed above.

First, do early attachment classifications predict later social competence and/or externalizing and internalizing behavior problems? Second, does sensitive and stimulating maternal parenting over the preschool years mediate the relationship between early attachment categorization and subsequent socioemotional outcomes? Third, when the quality of maternal parenting changes, are there concomitant effects on children's social outcomes regardless of early attachment, or are there continuing effects of early attachment? More specifically, do increases in positive, sensitive, and stimulating maternal parenting over time predict competent, adaptive functioning, regardless of early attachment? Likewise, are declines in maternal caregiving associated with poorer functioning for children regardless of early attachment classifications? Or are children who show a secure pattern of early attachment with mothers protected if maternal caregiving quality subsequently declines, whereas children who are initially insecure are more vulnerable?

Method

Participants

The NICHD SECC investigators recruited participants from 10 sites located in or near Little Rock, Arkansas; Orange County, California; Lawrence, Kansas; Boston, Massachusetts; Morganton, North Carolina; Pittsburgh, Pennsylvania; Philadelphia, Pennsylvania; Charlottesville, Virginia; Seattle, Washington; and Madison, Wisconsin. During selected 24-hr sampling periods within a 10-month period in 1991, 8,986 women were visited in the hospital following their infants' birth and screened for study eligibility and willingness to be contacted again. Of the women who gave birth during the sampling periods, 5,416 (60%) met the eligibility requirements (mother spoke English and was healthy and at least 18 years of age; infant was a healthy, singleton birth and not released for adoption; family lived within 1 hr of the research site, had no plans to move from the area in the coming year, and lived in an area not considered by police to be too dangerous for research assistants to visit in pairs¹) and agreed to be contacted after their return home from the hospital. A stratified random sample of 3,015 mothers was selected for a phone call 2 weeks after the child's birth to assure adequate representation of mothers without a partner, mothers without a high school diploma, and ethnic minority mothers. At these calls, families were excluded if the infant had been in the hospital more than 7 days or if the family could not be reached after at least three contact attempts. The number of mothers selected for the call that were eligible and agreed to an interview was 1,526.

When the infants were 1 month old, 1,364 families completed a home visit and were enrolled in the study. These families were very similar to the hospital sample on a number of variables: years of maternal education, proportion in different ethnic groups, and presence of a partner in the home. The final sample was diverse, including 52% boys, 24% ethnic minority children, 11% mothers who had not completed high school, and 14% single-parent families.

Families were followed, whenever possible, regardless of whether they moved during the course of the study. At 15 months, 1,201 children were videotaped in the Strange Situation. By first grade, 1,030 children received behavioral ratings by mothers, teachers, or both.

Mothers in the sample for these analyses ($n = 1,069$) had an average of 14.4 years of education ($SD = 2.4$ years), and 18% were single parents. Average family income was 3.8 times the poverty threshold ($SD = 3.1$), and 80% of the children were of European American, non-Hispanic descent. Children in the analysis sample differed from the other children who

¹ Fewer than 1.5% of families were excluded on the basis of this criterion.

were in the recruitment sample but did not have complete attachment or child-outcome data. Compared with mothers in the excluded families, mothers in the analysis sample had significantly more education at 1 month ($M = 14.4$ years vs. 13.5 years), had higher family incomes at 6 months (mean income-to-needs ratio = 3.8 vs. 3.2), were more sensitive overall and at each age ($M = .034$ vs. $-.332$), and were more likely to be partnered when the child was 6 months of age (82% vs. 74%). The two groups did not differ on the rate of change in parenting over time or on the percentage of children assigned to the different 15-month attachment categories. Compared with those in the recruitment sample, the children in the analysis sample were more likely to be of European American descent (80% vs. 74%) and less likely to be boys (50% vs. 58%).

Overview of Procedures and Measures

Infants and their mothers were seen in the laboratory or in their homes repeatedly from the time the child was 1 month of age until first grade. Data were collected using multiple methods: standardized observations of the child or the mother and child and interviews and questionnaires for the mothers. In addition, the child's care provider or teacher was asked to complete behavioral questionnaires when the child was 54 months of age, when the child was in kindergarten (at approximately 5 years of age), and when the child was in first grade (at approximately 6 years of age).

In the following sections, measures of the predictor variables (attachment and maternal caregiving) are described first, followed by descriptions of child outcome and demographic measures.

Attachment Classifications

Infant-mother attachment classification was measured when the children were 15 months old from videotapes of the children in the Ainsworth et al. (1978) Strange Situation procedure. Videotapes of all Strange Situations were coded in a central location by a team of three coders who were blind to other information about the child and family. These coders double-coded 1,201 Strange Situation assessments using the standard attachment classifications of secure (B), insecure-avoidant (A), anxious-resistant (C), disorganized (D), and unclassifiable (U). (Six of the assessments were not classified because of procedural or technical problems during data collection.) When two coders disagreed, the coders' group assigned an attachment classification code by consensus. Across all coder pairs, before conferencing, agreement with the 5-category classification system was 83% ($\kappa = .69$). The D and U classifications were combined.²

Maternal Parenting Measures

NICHD SECC researchers measured the quality of maternal parenting at each major data-collection point. For this investigation, we selected maternal parenting data when children were 15, 24, 36, and 54 months old. These ages were selected to assure that all maternal data were collected from the time the children's attachment was measured (at 15 months) until the first outcome measure was collected when the children were 54 months of age. In this way, none of the child outcomes were measured before maternal parenting measures were obtained.

Measures of maternal parenting were collected using two different methods: ratings of the mothers' behavior coded from videotaped observations of mother-child interaction and scores given to mothers after interviews and observations, using the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984). These two measures were combined at each age for a more reliable and comprehensive estimate of sensitive and stimulating maternal parenting quality at each age. From these new combined scores, composite scores across age as well as categorical change scores were created. In the following sections, we describe these individual data-collection procedures, and then we describe how we created the 15-54-month composite mean and categorical change scores.

Mother-child interaction. To assess maternal sensitivity, we videotaped mother-child interactions in semistructured 15-min observations at 15, 24, 36, and 54 months of age. At 15 months, we filmed in the home; at 24 and 54 months, we filmed in the laboratory. In these observation tasks, mothers were asked to play with their children with age-appropriate toys. At 15 and 24 months, the mothers were asked to show their children toys from three containers in a set order: a storybook, a toy stove with related objects, and a toy house with moving parts. At 36 months, the toys included a set of markers and stencils, dress-up clothes and cash register, and blocks with a pictured model to build. At 54 months, the interaction activities included two tasks that required the mother's instruction and assistance and a third activity that encouraged play between mother and child. At 54 months, the first activity was to complete a maze using an Etch A Sketch, with the mother controlling one knob and the child controlling the other. The second activity was to form same-sized rectangular cube "towers" from variously shaped wooden blocks. The third activity involved play with a set of six hand puppets.

Interaction tapes were coded at a central location. The coders, blind to family information and attachment classification, rated the interactions on several dimensions. At 15 and 24 months, coders used 4-point global rating scales (see NICHD ECCRN, 1999); at 36 and 54 months, coders used 7-point rating scales adapted from Egeland and Heister (1993; see NICHD ECCRN, 2003). The rating scales were designed to capture the mother's emotional and instrumental support for the child's engagement with the task activities as well as collaborative interactions between mother and child. Individual ratings were combined at each age to represent maternal sensitivity in the interaction tasks. At 15 and 24 months, the sensitivity was formed from the sum of three 4-point ratings: sensitivity to nondistress, positive regard, and intrusiveness (reverse scored). At 36 and 54 months, three 7-point ratings were combined to represent maternal sensitivity: supportive presence (analogous to sensitivity at earlier ages), respect for autonomy (analogous to intrusiveness [reflected]), and hostility (reverse scored). To combine scores across ages and scoring schemes, we normalized the scores within each age period before combining them.

We determined intercoder reliability by assigning two coders to 20% of the tapes randomly drawn at each assessment period. Coders were unaware of which tapes among their assignments were assigned to second coders, and reliability assessments were made throughout the period of coding. Intercoder reliability was calculated as the intraclass correlation (Winer, 1971). Reliability coefficients for the maternal sensitivity measures were .83, .84, .84, and .84 for the 15-, 24-, 36-, and 54-months ratings, respectively. Cronbach's alphas for maternal sensitivity ranged from .70 to .84. More information about the reliability and validity of these scores can be obtained in NICHD ECCRN (1999, 2003).

HOME. We used the HOME (Caldwell & Bradley, 1984) to assess the caregiving environment the mother provided for her child. The HOME enabled us to rate the overall quality of the physical and social resources available to a child within the home. The HOME consists of direct observations and a semistructured interview with the mother. The focus is on the child as a recipient of a high-quality environment consisting of stimulating objects, events, and interactions occurring in the family surroundings. The HOME total score is computed as the sum of 45 items at 15 months and as the sum of 55 items at 36 and 54 months, with higher

² Ds and Us were combined for several reasons. Historically, the system for classifying disoriented-disorganized behavior in the Strange Situation relied on using tapes that had initially been considered unclassifiable within the ABC system (Main & Solomon, 1990). The D classification system was developed from these cases. Main and Solomon (1990, p. 155) said that it appears that lack of resolution of trauma is similarly related to both U and D classifications. Both share behavior that is inexplicable in respect to organized attachment strategies, and both groups appear to be at similar risk for later psychosocial problems.

values denoting higher levels of maternal responsiveness, child stimulation, and support for the child. The data collectors attended centralized training sessions prior to collecting the data and were required to maintain reliability on 90% of items.

We administered the infant–toddler version at the child’s 15-month visit and the early childhood version at 36 and 54 months. (There was no HOME at 24 months.) Cronbach’s alpha for the total HOME score was .80 at 15 months, .87 at 36 months, and .82 at 54 months. Correlations across time ranged from .48 to .70 ($p < .0001$).

Composite scores of positive maternal parenting. Zero-order and partial correlations (controlling for site, child gender, maternal education, and income-to-needs ratio) showed that maternal parenting sensitivity and HOME scores were significantly correlated. Partial Pearson product–moment correlations within each age ranged from .27 ($p < .001$) to .31 ($p < .001$). Because of these relations, we composited these measures of positive maternal parenting at 15, 24, 36, and 54 months by combining the means of the standardized maternal sensitivity and the standardized HOME total scores. Because there was no HOME score at 24 months, a 24-month HOME measure was inferred from the 36- and 54-month HOME scores.

Next, using the composited scores of positive maternal parenting at 15, 24, 36, and 54 months of age, we created maternal parenting mean and change scores using hierarchical linear modeling (HLM) procedures. One score—the intercept—represented mean maternal parenting quality at the centered age; the second—the slope—represented the rate of linear change over time (for more details on the creation of this measure, see NICHD ECCRN, 2002). These two summary measures—mean and slope—capture two aspects of a broad dimension of optimal maternal parenting over time: the *mean* quality of the mother’s sensitivity and stimulation when the child was 15–54 months of age and the overall *change* in quality of the mother’s sensitivity and stimulation across the infancy and preschool years.

The validity of these parenting measures derived from HLM analyses of the 15–54-month composites from mother–child interaction and the HOME described above was reported in an earlier report from the NICHD Study of Early Child Care and Youth Development (NICHD ECCRN, 2002). In that report, the parenting intercept predicted seven measures of children’s cognitive and social outcomes prior to school entry, including academic, language, memory, and social skills and behavior problems. Significant associations with the parenting slope measure indicated that an increase in positive caregiving over time was related to children’s greater academic and language skills and fewer behavior problems prior to entry into elementary school.

Categorical measures of change over time in maternal parenting quality. In our hypotheses, we had two kinds of predictions. Following the mediating model of continuing attachment effects, we predicted that more sensitive parenting would mediate the relationship between early attachment and subsequent child outcome. To test that prediction, we used the linear intercept scores of parenting. Our second set of hypothesized predictions pertained to how children with different attachment histories would respond to increasing, decreasing, or stable parenting environments. Because these hypotheses were categorical rather than linear in predicting child outcomes, we required categorical scores of maternal parenting change and stability. To create these categorical measures, we placed the estimated slopes from the HLM analyses of the maternal parenting composite measure into one of three categories: -1 if the parenting slope was in the bottom quartile, 0 if it was between the 25th and 75th percentile, and 1 if it was in the top quartile. The mean maternal parenting composite scores for these three parenting change groups are presented in Table 1. These groups represent, respectively, declining maternal caregiving quality over time (D), no change in maternal parenting quality (S), and increasing maternal parenting quality over time (I).

We assessed the validity of the maternal parenting composite change scores by examining differences between maternal parenting-change groups on the measures of family income, maternal depression, and maternal attitudes toward traditional parenting. Mothers in the three groups

Table 1
Descriptive Statistics of Parenting Slope for the Three Parenting Change Groups

Parenting quality	<i>N</i>	<i>M</i>	<i>SD</i>	Minimum	Maximum
Declining (D)	287	−.13	.06	−.35	−.07
Stable (S)	506	−.01	.03	−.07	.05
Increasing (I)	276	.11	.06	.05	.42

did not differ in averaged-over-time income, averaged-over-time maternal depression, or scores for maternal attitudes toward traditional parenting practices. However, when the infants were 1 month old, the groups representing top and bottom quartiles of parenting change differed on scores of income-to-needs ratio, $F(1, 1019) = 5.67, p = .02$, and maternal depression, $F(1, 965) = 4.71, p = .03$. As expected, the 1 group showed higher income-to-needs ratio and lower depression scores than the -1 group. These analyses suggest that the direction of change in maternal parenting, not the mean amount of parenting over time, was being tapped by this change measure.

Child Developmental Outcomes

The child outcomes examined in this study were mother-, caregiver-, and teacher-report measures of social competence and problem behavior obtained when children were 54 months of age, in kindergarten, and in first grade. For our analyses, caregivers, teachers in kindergarten, and teachers in first grade were considered the same “reporter” of the child’s behavior outside of the family. Obtaining these measures over time not only allowed for repeated, more reliable measurement, it also allowed us to examine developmental trends in children’s behaviors.

Social competence. We measured social competence by having mothers complete the Social Skills Questionnaire from the Social Skills Rating System (SSRS; Gresham & Elliott, 1990). This instrument is composed of 38 items describing child behavior. Mothers use a 3-point scale to indicate how often their child exhibits each behavior. Items are grouped into four areas: cooperation (e.g., keeps room neat and clean without being reminded), assertion (e.g., makes friends easily), responsibility (e.g., asks permission before using a family member’s property), and self-control (controls temper when arguing with other children). The total score is the sum of all 38 items, with higher scores reflecting higher levels of perceived social competence. The SSRS was normed on a diverse, national sample of children in the 3–5-year-old age range, and it has shown high levels of internal consistency (median = .90) and test–retest reliability (.75–.88). Cronbach’s alpha in the current sample was .88. The validity (content, criterion, and construct) of the SSRS has been documented extensively by Gresham and Elliott (1990).

Behavior problems. We assessed behavior problems by having mothers, caregivers, and teachers complete the appropriate versions of the Child Behavior Checklist (Achenbach, 1991a, 1991b, 1991c), a widely used measure of behavior problems, when children were 54 months of age and when the children were in kindergarten and first grade. At each age, mothers completed the Child Behavior Checklist/4–18 (CBCL; Achenbach, 1991a, 1991b). If the child was in child care at 54 months of age, caregivers completed the C-TRF/2–5. In first grade, teachers completed the Teacher’s Report Form (TRF; Achenbach, 1991c). The problem items provide information on two broad domains of functioning, *internalizing problems* (withdrawal, somatic complaints, anxiety, and depression) and *externalizing behaviors* (delinquent behavior, aggression). The CBCL, completed by the mother, lists 113 problem behaviors. The parent rates each as *not true* (0), *somewhat true* (1), or *very true* (2) of the child. The TRF/5–18, completed by teachers, has 100 similar items.

Two problem-behavior scores served as dependent variables in these analyses—externalizing and internalizing behavior problems. We converted raw scores into standard T scores on the basis of normative data for children 4–11 years of age.

Reliability and validity of these scores are well established (Achenbach, 1991a). Achenbach (1991a) reported test–retest reliability of .89, interparent agreement of .70, and stability of scale of .71 over 2 years. Cronbach's alphas for the mother version in the current sample were .81 for internalizing and .88 for externalizing. For the teacher version, Cronbach's alphas were .90 for internalizing and .95 for externalizing in the current sample.

Maternal, Child, and Family Control Variables

Demographic variables. During home interviews at 1 month, mothers reported their education (in years) and the study children's sex and ethnicity (non-Hispanic African American, non-Hispanic European American, Hispanic, or other). The presence of a husband or partner in the home was reported in telephone interviews spaced every 3–4 months. Partner status was the proportion of 3–4-month intervals during which the mother reported the presence of a husband–partner in the home. Mothers reported family income at 15, 24, 36, and 54 months. Income-to-needs ratios were calculated from U.S. Census Bureau tables as the ratio of family income to the appropriate poverty threshold for each household size and number of children less than 18 years of age. For example, an income of \$15,455 in 1995 for a family of four would translate into an income-to-needs ratio of 1. Data-collection site, child gender, maternal education, and income-to-needs measures were used as control variables in all regression analyses.

Maternal depressive symptoms. Maternal depressive symptoms were assessed at 15, 24, 36, and 54 months using the Center for Epidemiological Studies Depression scale (CES-D; Radloff, 1977), a self-report measure that assesses depressive symptomatology in the general population. Cronbach's alpha coefficients ranged from .88 to .91 in the present sample. The intercept and linear slope were included as factors in the current analyses. This measure was used only for validating the composite parenting-change scores.

Maternal attitudes toward child rearing. Maternal attitudes toward child rearing were assessed at 1 month with the Parental Modernity Scale of Child Rearing and Education Beliefs (Schaefer & Edgerton, 1985). The total score reflected less progressive–democratic beliefs and more traditional–authoritarian beliefs about raising children. Schaefer and Edgerton (1985) reported that the total score was negatively associated with child intelligence. Cronbach's alpha in this study was .84. This measure was used only for validating the composite maternal parenting-change scores.

More details about data-collection procedures are documented in the manuals of operation of the study (which can be found at <http://secc.rti.org>).

Results

As indicated in the Method section, we created parenting intercept scores and parenting-change groups to measure positive maternal parenting quality. We did this by analyzing parenting scores from 15, 24, 36, and 54 months with a linear growth-curve analysis using unconditional HLM (Bryk & Raudenbush, 1997). We centered age at the mean age and computed an intercept and linear slope for each family. We transformed the linear slope from a continuous variable into three categories on the basis of a quartile split (bottom, middle two quartiles, and top), with the groups representing decline in parenting, no change over time, and an increase in parenting. The means, standard deviations, and ranges for the linear slope scores for the three parenting-change groups are given in Table 1.

In Table 2, we present scores on each of the demographic and maternal parenting measures (for composite scores as well as for the individual parenting variables [sensitivity and HOME] that were used to create the composite parenting measures) for the children in each of the four attachment categories. We also present the results of statistical tests for differences on these measures as a function of attachment group in this table.

As Table 2 indicates, overall maternal parenting from 15 to 54 months (parenting intercept) was similar for the secure, ambivalently attached, and disorganized children and lower for the avoidantly attached children, $F(3, 1065) = 12.00, p < .001$. There were no differences in slope scores, and within each of the four attachment groups, similar proportions of parents showed increases or decreases in overall maternal parenting from 15 to 54 months.

In Table 3, we present the means and standard deviations for the outcome variables for the 12 groups of interest—each of the three change groups within the four types of attachment. The outcome measures were mother and teacher ratings of social skills on the SSRS and externalizing and internalizing problem ratings on the CBCL.

In Tables 4, 5, and 6, we present the results and effect sizes from regression models examining the effects of attachment, maternal parenting composite scores, parenting change, and their interactions on the six outcomes measures at 4.5 years, kindergarten, and first grade. We fitted two longitudinal repeated measures analysis of variance models to each of the outcome measures. In each analysis we adjusted for dependencies in the repeated assessments by estimating a separate variance for the outcome at each age and a covariance for each combination of ages. In all models, we included site of data collection, child age, child sex, maternal education, and income as covariates, allowing the coefficients for these covariates to vary linearly over time. We used the first model to examine whether 15-month attachment categories predicted social–emotional outcomes between 54 months and the end of first grade by including attachment and Attachment \times Age as predictors. We used the second model to examine whether concurrent and subsequent parenting accounted for observed attachment associations (i.e., was a mediator) or whether it moderated these associations. In this second model, we tested the main effects of parenting mean and parenting change groups as well as the interactions between parenting mean and change, the interactions between each of the two parenting variables and attachment, and the interactions between each of those terms, child gender, and age.

Across the six outcome variables and two models, we found only one interaction between site and parenting mean and three interactions between gender and parenting change or slope. None of these interactions were meaningful or consistent, and so we do not report them.

In Table 4, we present the results from the analyses concerning the child outcomes of mother and teacher ratings of social skill competencies; in Table 5, we present the results for the mother and teacher ratings of externalizing CBCL scores; and in Table 6, we present the results for the mother and teacher ratings of internalizing CBCL scores. In the second column of each of these tables, we indicate whether the values in that row are F statistics or regression coefficients and standard errors. We report F statistics for all factors with more than two levels, unstandardized coefficients for all continuous predictors with only one level, and ad-

Table 2
Descriptive Characteristics: Demographic Characteristics and Parenting Experience by Attachment Classification

Variable	15-month attachment category								Test statistics
	A (n = 145)		B (n = 641)		C (n = 89)		D (n = 194)		
	M	SD	M	SD	M	SD	M	SD	
Gender									
Male	58%		49%		57%		46%		$\chi^2(1, N = 1,069) = 10.0^*$ A > B, D
Female	42%		51%		43%		54%		
Ethnicity									
White	77%		84%		87%		78%		$\chi^2(12, N = 1,069) = 15.5$
African American	17%		10%		10%		14%		
Other	6%		6%		3%		8%		
Parents married (6 mo.)	57%		79%		81%		70%		$\chi^2(3, N = 1,056) = 33.3^{***}$ A < D < B, C
Maternal education (years)	14.0	2.2	14.6	2.4	14.9	2.3	14.1	2.6	$F(3, 1065) = 5.01^{**}$ B, C > A
Income-to-needs ratio (6 mo.)	3.1	2.6	3.8	3.1	4.0	3.0	3.8	3.5	$F(3, 1046) = 2.4$
Maternal CES–D (6 mo.)	9.3	9.6	8.9	8.2	9.6	10.2	9.2	7.7	$F(3, 1053) = 0.2$
Parenting intercept (sensitivity + HOME)	–.23	.69	.10	.61	.14	.65	–.03	.69	$F(3, 1065) = 12.0^{***}$ B, C, D > A
Parenting slope	–.01	.12	–.01	.10	–.01	.09	–.01	.10	$F(3, 1065) = 0.0$
Parenting change group									
Bottom quartile	30%		26%		25%		28%		$\chi^2(6, N = 1,069) = 3.64$
Middle 2 quartiles	44%		48%		54%		44%		
Top quartile	25%		26%		21%		27%		
Mean sensitivity									
6 mo.	8.8	1.7	9.3	1.7	9.6	1.7	9.1	1.9	$F(3, 1049) = 4.5^{**}$ B, C > A
15 mo.	9.1	1.7	9.6	1.6	9.7	1.5	9.3	1.8	$F(3, 1059) = 5.1^{**}$ B, C > A
24 mo.	8.8	2.1	9.6	1.6	9.5	1.7	9.3	1.8	$F(3, 1035) = 8.6^{***}$ B, C > A
36 mo. ^a	16.8	2.8	17.4	2.5	17.4	2.9	17.1	3.1	$F(3, 1033) = 2.2$
54 mo. ^a	16.3	3.2	17.2	2.7	17.4	2.9	16.6	3.0	$F(3, 998) = 4.8^{**}$ B, C > A
HOME total									
6 mo.	35.5	4.7	37.1	4.3	37.2	5.0	36.6	4.4	$F(3, 1053) = 5.4^{**}$ B, C > A
15 mo.	36.3	5.7	38.0	4.2	37.9	4.6	37.2	4.5	$F(3, 1056) = 5.7^{***}$ B > A
36 mo.	39.3	7.2	42.2	7.2	42.8	7.2	41.9	7.0	$F(3, 1032) = 7.0^{***}$ B, C, D > A
54 mo. ^b	44.5	5.7	46.5	5.1	46.7	5.5	45.8	5.5	$F(3, 996) = 6.2^{***}$ B, C > A

Note. Scales changed over time. CES–D = Center for Epidemiological Studies Depression scale; HOME = Home Observation for Measurement of the Environment.

^a Scale changed from 4- to 7-point rating scale. ^b Scale changed from infant version to preschool version.

* $p < .05$. ** $p < .01$. *** $p < .001$.

justed means and standard error estimates for categorical predictors of interest. Results are bolded when significant associations involving attachment or parenting obtained. We also report effect sizes in the table. Because of the tables' length and complexity, we describe these regression results in some detail.

Maternal Ratings of Social Skills

In the left columns of Table 4, we present the results of the longitudinal analysis of maternal ratings of social skills (SSRS) from 54 months to Grade 1. Mothers rated their children as showing higher social skills as the children grew older (age coefficient = 2.19, $p < .001$), when their children were female (male

coefficient = –3.61, $p < .001$), when the mother had more education ($B = 1.07$, $p < .001$), and when family income was higher ($B = 0.22$, $p < .05$). Although ratings of social skills improved with age, neither attachment nor the covariates were associated with age changes in maternal social-skills ratings.

Analyses listed under the heading Model 1 show that SSRS scores differed significantly for children with different attachment classifications, $F(3, 1027) = 2.65$, $p = .04$. We list the adjusted means for the four categories in the rows below the F statistic. As the pairwise comparisons indicate, avoidant children (those with an A classification) were rated as showing significantly lower social skills than were secure children (those with a B classification).

Table 3
Child Outcomes From 54 Months to Grade 1 by Attachment Category and Parenting Change Group (Declining, Stable, or Increasing)

Measure	A (insecure-avoidant)			B (secure)			C (anxious-resistant)			D (disorganized)		
	Declining	Stable	Increasing	Declining	Stable	Increasing	Declining	Stable	Increasing	Declining	Stable	Increasing
Mother ratings of social skills												
SSRS												
54 mo.												
<i>n</i>	39	62	37	159	292	156	22	43	18	53	84	50
<i>M</i>	94.74	96.37	96.46	96.33	100.6	97.64	95.32	100.80	96.28	96.70	98.77	97.02
<i>SD</i>	12.90	14.22	12.26	13.48	12.97	13.23	14.61	10.44	14.16	13.99	98.77	97.02
Kinder.												
<i>n</i>	42	61	36	153	296	151	21	47	17	50	83	52
<i>M</i>	97.05	99.95	99.64	101.80	105.60	101.50	100.10	104.00	104.20	101.40	102.00	101.30
<i>SD</i>	13.88	14.31	13.84	15.36	13.41	15.48	14.79	13.93	16.93	11.89	16.82	14.59
Grade 1												
<i>n</i>	39	58	36	148	292	152	18	45	18	49	84	51
<i>M</i>	99.59	102.10	103.30	102.80	108.50	104.00	101.80	106.40	103.20	104.00	107.00	103.30
<i>SD</i>	15.15	16.17	13.67	15.44	13.51	15.40	19.39	12.80	15.65	14.75	15.80	14.24
Teacher ratings of social skills												
SSRS												
Kinder.												
<i>n</i>	37	52	34	145	273	149	20	46	18	45	81	51
<i>M</i>	97.73	102.60	104.30	102.90	105.10	103.10	104.10	105.10	104.40	101.10	103.90	102.70
<i>SD</i>	17.30	14.80	13.40	13.63	13.70	14.12	14.99	12.13	13.44	12.32	15.18	12.68
Grade 1												
<i>n</i>	40	58	33	149	278	149	19	43	19	46	81	47
<i>M</i>	94.70	103.10	104.30	102.60	105.20	102.80	99.47	105.60	107.00	101.50	105.20	103.10
<i>SD</i>	13.15	13.19	13.51	13.08	13.13	14.03	11.53	12.11	14.22	14.41	15.68	11.51
Mother ratings of externalizing problems												
CBCL												
54 mo.												
<i>n</i>	40	61	37	160	293	159	22	42	18	53	84	51
<i>M</i>	54.28	52.69	52.97	53.99	50.30	52.23	54.73	49.55	51.89	52.36	49.79	50.04
<i>SD</i>	9.95	9.40	8.10	9.42	9.75	8.82	8.27	8.80	7.66	8.80	9.56	10.78
Kinder.												
<i>n</i>	42	61	37	154	296	151	21	47	17	51	83	52
<i>M</i>	55.33	49.16	49.97	52.58	48.67	49.43	52.57	47.98	50.53	50.73	48.76	48.19
<i>SD</i>	9.22	9.93	8.75	9.58	9.55	9.48	8.11	8.39	11.82	9.74	10.00	10.88
Grade 1												
<i>n</i>	39	57	36	149	292	151	18	45	18	49	84	51
<i>M</i>	53.10	48.74	49.83	50.80	47.30	48.48	53.17	46.20	50.56	49.88	46.77	47.80
<i>SD</i>	9.90	8.70	8.56	10.09	9.66	10.17	10.18	9.24	8.80	8.97	9.67	9.80
Teacher ratings of externalizing problems												
TRF												
54 mo.												
<i>n</i>	26	37	25	106	210	100	15	28	14	35	54	29
<i>M</i>	56.69	51.65	49.20	50.87	49.30	49.86	53.40	48.43	47.00	52.29	48.85	49.03
<i>SD</i>	11.51	8.51	8.65	9.19	9.50	9.88	8.30	7.98	9.66	12.37	8.68	8.25
Kinder.												
<i>n</i>	37	54	34	146	279	148	20	47	18	46	80	52
<i>M</i>	52.49	50.11	49.59	49.71	48.87	49.33	52.10	47.74	48.11	51.83	51.29	49.04
<i>SD</i>	8.49	9.56	8.98	8.67	8.29	8.43	9.54	7.95	10.29	8.57	10.81	9.14
Grade 1												
<i>n</i>	40	58	33	149	280	150	19	44	19	46	81	49
<i>M</i>	56.38	51.07	50.55	50.50	49.55	51.13	54.74	47.57	49.42	51.07	51.10	49.20
<i>SD</i>	9.54	9.09	9.29	8.53	8.06	8.38	11.44	7.32	7.86	8.80	9.80	7.00
Mother ratings of internalizing problems												
CBCL												
54 mo.												
<i>n</i>	40	61	37	160	293	159	22	42	18	53	84	51
<i>M</i>	49.68	46.95	48.05	48.56	46.30	47.97	48.00	47.62	45.39	47.15	46.92	45.57
<i>SD</i>	10.29	8.58	10.15	8.98	9.67	8.55	8.15	10.81	8.80	8.78	8.85	8.24

Table 3
Continued

Measure	A (insecure–avoidant)			B (secure)			C (anxious–resistant)			D (disorganized)		
	Declining	Stable	Increasing	Declining	Stable	Increasing	Declining	Stable	Increasing	Declining	Stable	Increasing
Kinder.												
<i>n</i>	42	61	37	154	296	151	21	47	17	51	83	52
<i>M</i>	50.48	44.66	48.27	48.51	46.04	47.27	46.43	47.47	45.88	47.20	47.75	45.81
<i>SD</i>	10.30	8.99	9.84	9.06	8.58	9.29	8.03	11.00	9.40	8.26	8.83	8.82
Grade 1												
<i>n</i>	39	57	36	149	292	151	18	45	18	49	84	51
<i>M</i>	50.77	47.12	49.50	49.60	47.31	48.34	50.72	48.13	47.17	48.55	48.67	48.18
<i>SD</i>	7.51	9.00	9.12	9.00	8.38	9.14	8.22	9.99	8.73	9.86	10.02	7.65
Teacher ratings of internalizing problems												
TRF												
54 mo.												
<i>n</i>	26	37	25	106	210	100	15	28	14	35	54	29
<i>M</i>	52.85	51.76	52.40	50.33	49.70	49.90	50.53	51.64	50.43	52.91	50.63	51.76
<i>SD</i>	10.04	8.24	9.22	9.28	10.24	9.87	7.81	10.64	11.55	9.25	9.53	9.53
Kinder.												
<i>n</i>	37	54	34	146	279	148	20	47	18	46	80	52
<i>M</i>	48.51	48.22	46.59	46.55	46.68	45.87	48.00	47.30	45.83	47.93	47.55	48.90
<i>SD</i>	8.32	10.29	8.95	9.16	9.13	8.44	10.15	7.76	8.70	8.72	8.87	10.49
Grade 1												
<i>n</i>	40	58	33	149	280	150	19	44	19	46	81	49
<i>M</i>	52.55	49.41	49.27	49.14	48.73	48.25	51.58	48.14	47.16	48.80	50.75	51.02
<i>SD</i>	8.64	9.04	9.57	8.66	9.20	9.03	9.68	7.50	11.02	9.36	10.00	10.03

Note. SSRS = Social Skills Rating System; Kinder. = kindergarten; CBCL = Child Behavior Checklist; TRF = Teacher’s Report Form.

In Model 2, we added concurrent–subsequent maternal parenting quality to the model. We show these results in the next column of Table 4. Attachment was no longer a significant predictor; instead, the overall level of maternal parenting (15–54-month parenting mean) was strongly related to these maternal ratings ($B = 7.02, p < .001$), with a moderate effect size (.33). More sensitive parenting predicted higher maternal ratings of the child’s social competence across all children. SSRS scores did not reliably differ among the parenting change groups, and no evidence emerged suggesting that attachment moderated the association between parenting and social skills—that is, none of the interactions involving attachment and parenting were significant. Furthermore, neither the average level, nor concurrent–subsequent parenting, nor change in parenting over time was related to any change in social-skills ratings from 54 months to Grade 1.

Teacher Ratings of Social Skills

We observed a different pattern of results when we predicted teacher ratings on social skills (SSRS) from kindergarten through Grade 1 (see columns on the right side of Table 4). As the results of Model 1 in Table 4 indicate, child attachment did not significantly predict teacher-rated social skills. Data-collection site and maternal education were the only factors that independently predicted teacher ratings in the first analysis. None of the factors related to patterns of age change in the teachers’ ratings.

Parenting between 15 and 54 months significantly predicted teacher ratings of social skills from 54 months to Grade 1. In Model 2, both overall level of parenting (mean score; $B = 5.00, p < .001$, effect size = .25) and change in parenting over time (parenting change; $F[2, 962] = 5.31, p < .01$, effect size = .31)

predicted children’s overall level of social skills. When parents were more responsive and stimulating overall from 15–54 months, teachers rated children more positively on social skills. At the same time, teachers rated children less positively when parenting declined in responsiveness over time ($M = 100.9$) than they did when parenting was stable ($M = 103.9$) or increased ($M = 105.2$) in responsiveness over time. Furthermore, the Parenting Mean \times Parenting Change interaction, $F(2, 962) = 6.70, p \leq .01$, effect sizes = .11–.36, suggests that overall level of parenting was a weaker predictor of social skills for children whose parenting scores declined than for other children. The magnitude of the association between the parenting mean and teacher ratings of social skills was significantly smaller for children whose parents declined in sensitivity ($B = 2.28$, effect size = .11) than for children whose parents remained stable ($B = 7.25$, effect size = .36) or increased in sensitivity over time ($B = 5.46$, effect size = .27). This implies that the association between parenting and later social skills was weaker for those children whose parents showed declining responsiveness than it was for other children. There was no evidence that the child’s attachment rating moderated these associations.

Maternal Ratings of Externalizing Problems

In Table 5, regressions predicting to mothers’ and teachers’ ratings of externalizing problems show that mothers rated children as showing more externalizing problems when the child was male ($B = 1.21, p < .05$), when mothers had less education ($B = -0.49, p < .001$) and when the family had lower income ($B = -0.15, p < .05$). On average, when the family had lower income, children

Table 4
Results From Longitudinal Analyses of Maternal and Teacher Ratings of Social Skills

Variable	Statistic	Mother-rated social skills—SSRS: 54 mo., kindergarten, Grade 1 (n = 1,043)				Teacher-rated social skills—SSRS: Kindergarten, Grade 1 (n = 992)			
		Model 1	Effect size	Model 2	Effect size	Model 1	Effect size	Model 2	Effect size
Covariates									
Site	F(9,)	0.57		0.92		2.31*		1.88	
Age	B(SE)	2.19 (0.61)***	.15	2.20 (0.90)*	.15	-0.67 (1.44)		-0.84 (2.07)	
Sex	B(SE)	-3.61 (0.77)***	.47	-4.03 (0.74)***	.27	-0.99 (0.72)		-1.36 (0.70)	
M ed.	B(SE)	1.07 (0.17)***	.18	0.08 (0.19)		1.21 (0.17)***	.22	0.45 (0.19)	
Income	B(SE)	0.22 (0.10)*	.05	0.07 (0.10)		0.07 (0.13)		-0.16 (0.13)	
Age × Sex	B(SE)	0.59 (0.32)		0.55 (0.32)		0.53 (0.75)		0.40 (0.75)	
Age × M Ed.	B(SE)	0.13 (0.08)		0.08 (0.09)		0.13 (0.19)		0.20 (0.21)	
Age × Income	B(SE)	0.02 (0.06)		0.02 (0.06)		-0.20 (0.16)		-0.18 (0.16)	
Attachment (Att.)									
Att. category	F(3,)	2.65* A < B		1.29		1.93		0.76	
A	M(SE)	99.2 (1.06)		100.0 (1.13)		101.49 (0.99)		102.3 (1.06)	
B	M(SE)	102.4 (0.50)		101.7 (0.50)		104.1 (0.46)		103.7 (0.47)	
C	M(SE)	100.6 (1.33)		99.9 (1.37)		104.2 (1.23)		103.9 (1.27)	
D	M(SE)	101.9 (0.90)		102.2 (0.89)		103.5 (0.84)		103.5 (0.84)	
Age × Att.	F(3,)	0.71		0.44		0.44		0.46	
A	B(SE)	1.82 (0.63)		1.87 (0.65)		-1.01 (1.51)		-1.15 (1.55)	
B	B(SE)	1.86 (0.52)		1.84 (0.54)		-0.55 (1.25)		-0.29 (1.26)	
C	B(SE)	1.22 (0.71)		1.43 (0.76)		-2.08 (1.65)		-1.84 (1.76)	
D	B(SE)	2.19 (0.61)		2.21 (0.63)		-0.67 (1.44)		-0.61 (1.47)	
Parenting (Par.): 15–54 mo.									
Par. M	B(SE)			7.02 (0.84)***	.33			5.00 (0.81)***	.25
Par. change group	F(2,)			1.03				5.31**	.31
D < S, I									
Decline (D)	M(SE)			99.8 (0.95)				100.9 (0.90)	
Stable (S)	M(SE)			101.5 (0.70)				103.9 (0.65)	
Increase (I)	M(SE)			101.4 (0.99)				105.2 (0.91)	
Age × Par. M	B(SE)			0.17 (0.30)				-0.85 (0.90)	
Age × Par. Change	F(2,)			0.96				1.28	
Attachment × Parenting									
Par. M × Att.	F(3,)			0.80				2.11	
Par. Change × Att.	F(6,)			0.45				1.14	
Age × Par. M × Att.	F(2,)			0.47				1.39	
Age × Par. Change × Att.	F(6,)			0.27				0.30	
Parenting Mean × Parenting Change									
Par. M × Par. Change	F(2,)			0.36				6.70**	
D < (S, I)									
D	B(SE)							2.28 (1.15)	.11
S	B(SE)							7.25 (1.07)	.36
I	B(SE)							5.46 (1.20)	.27
Age × Par. M × Par. Change	F(2,)			0.47				0.95	

Note. Results for which significant associations involving attachment or parenting obtain are shown in boldface. SSRS = Social Skills Rating System; ed. = education.

* $p < .05$. ** $p < .01$. *** $p < .001$.

showed a pattern of increasing externalizing scores between 54 months and first grade ($B = -0.08, p < .05$).

Although mothers' externalizing ratings were not significantly different among the children in the four attachment groups, parenting scores were significantly associated in Model 2 with maternal externalizing ratings between 54 months and first grade.

Maternal ratings of externalizing problems were significantly related to both the parenting mean, $F(1, 1014) = 1.99, p < .001$, effect size = .14, and the parenting change groups, $F(2, 1014) = 9.23, p < .001$, effect size = .33. Mothers reported more externalizing problems when parenting was less responsive and stimulating and when parenting responsiveness declined over time ($M =$

Table 5
Results From Longitudinal Analyses of Maternal and Teacher Ratings of Externalizing Behaviors

Variable	Statistic	Mother-rated externalizing T score—CBCL: 54 mo., kindergarten, Grade 1 (n = 1,043)			Teacher-rated externalizing T score—CBCL: 54 mo., kindergarten, Grade 1 (n = 1,009)				
		Model 1	Effect size	Model 2	Effect size	Model 1	Effect size	Model 2	Effect size
Covariates									
Site	F(9,)	1.34		1.41		2.60**		2.69**	
Age	B(SE)	−0.54 (0.38)		−0.94 (0.55)		0.71 (0.56)		0.44 (0.83)	
Sex	B(SE)	1.21 (0.54)*	.06	1.40 (0.52)*	.07	0.18 (0.45)		0.38 (0.44)	
M ed.	B(SE)	−0.49 (0.12)***	.13	−0.01 (0.14)		−0.39 (0.11)		0.09 (0.12)	
Income	B(SE)	−0.15 (0.07)*	.05	−0.08 (0.07)		−0.07 (0.07)		0.03 (0.07)	
Age × Sex	B(SE)	−0.28 (0.20)		−0.24 (0.20)		−0.05 (0.29)		−0.02 (0.29)	
Age × M Ed.	B(SE)	−0.04 (0.05)		−0.02 (0.05)		0.01 (0.07)		0.00 (0.08)	
Age × Income	B(SE)	−0.08 (0.04)*		−0.08 (0.04)*		−0.04 (0.05)		−0.02 (0.05)	
Attachment (Att.)									
Att. category	F(3,)	1.97		1.96		2.72*	.21	1.56	
						A > B, C			
A	M(SE)	51.40 (0.74)		51.10 (0.74)		51.50 (0.63)		51.40 (0.67)	
B	M(SE)	50.10 (0.34)		50.50 (0.35)		49.6 (0.29)		49.80 (0.29)	
C	M(SE)	50.80 (0.93)		50.9 (0.97)		49.90 (0.78)		49.90 (0.80)	
D	M(SE)	49.00 (0.63)		49.00 (0.63)		50.20 (0.53)		49.80 (0.53)	
Age × Att.	F(3,)	0.80		1.04		0.49		0.99	
A	B(SE)	−0.66 (0.30)		−0.67 (0.40)		0.43 (0.60)		0.41 (0.60)	
B	B(SE)	−0.90 (0.32)		−1.02 (0.33)		0.25 (0.48)		0.12 (0.49)	
C	B(SE)	−0.66 (0.44)		−0.69 (0.47)		0.45 (0.64)		0.95 (0.68)	
D	B(SE)	−0.54 (0.38)		−0.62 (0.38)		0.71 (0.56)		0.59 (0.57)	
Parenting (Par.): 15–54 mo.									
Par. M	B(SE)			−1.99 (0.59)***	.14			−2.88 (0.50)***	.22
Par. change	F(2,)			9.23***	.33			10.45***	.40
				D > S, I				D < S, I	
Decline (D)	M(SE)			52.40 (0.63)				52.20 (0.57)	
Stable (S)	M(SE)			49.20 (0.50)				49.80 (0.41)	
Increase (I)	M(SE)			49.50 (0.70)				48.60 (0.58)	
Age × Par. M	B(SE)			−0.10 (0.23)				−0.55 (0.35)	
Age × Par. Change	F(2,)			1.21				0.47	
Attachment × Parenting									
Par. M × Att.	F(3,)			4.49**				3.14*	
				C > A, B, D^a				A > D; C > B, D^b	
A	B(SE)			−2.35 (1.10)	.16			−2.28 (0.96)	.18
B	B(SE)			−4.20 (0.66)	.29			−3.65 (0.56)	.28
C	B(SE)			1.23 (1.47)	.09			−0.82 (1.23)	.06
D	B(SE)			−2.65 (0.94)	.19			−4.76 (0.80)	.36
Par. Change × Att.	F(6,)			0.52				2.76^{bc}	
Age × Par. M × Att.	F(3,)			0.54				3.48*	
								B > C	
A	B(SE)							−0.04 (0.69)	.00
B	B(SE)							0.51 (0.38)	.04
C	B(SE)							−2.16 (0.83)	.15
D	B(SE)							−0.52 (0.56)	.04
Age × Par. Change × Att.	F(6,)			0.74				0.25	
Parenting Mean × Parenting Change									
Par. M × Par. Change	F(2,)			0.03				1.11	
Age × Par. M × Par. Change	F(2,)			3.38*	.10				0.24
				I < S, D					
D	B(SE)			0.23 (0.33)					
S	B(SE)			0.15 (0.32)					
I	B(SE)			−0.72 (0.37)					

Note. Results for which significant associations involving attachment or parenting obtain are shown in boldface. CBCL = Child Behavior Checklist; ed. = education.

^a See Figure 1. ^b See Figure 2B. ^c See Figure 2A.

* p < .05. ** p < .01. *** p < .001.

Table 6
Results From Longitudinal Analyses of Maternal and Teacher Ratings of Internalizing Behaviors

Variable	Statistic	Mother-rated internalizing—CBCL: 54 mo., kindergarten, Grade 1 (n = 1,043)				Teacher-rated internalizing—CBCL: 54 mo., kindergarten, Grade 1 (n = 1,009)			
		Model 1	Effect size	Model 2	Effect size	Model 1	Effect size	Model 2	Effect size
Covariates									
Site	<i>F</i> (9,)	1.74		1.83		0.80		0.93	
Age	<i>B</i> (<i>SE</i>)	0.51 (0.42)		0.76 (0.62)		0.65 (0.74)		0.65 (1.12)	
Sex	<i>B</i> (<i>SE</i>)	-0.00 (0.49)		0.09 (0.49)		-0.05 (0.41)		0.11 (0.41)	
<i>M</i> ed.	<i>B</i> (<i>SE</i>)	-0.17 (0.11)		0.03 (0.13)		-0.21 (0.10)*		0.01 (0.11)	
Income	<i>B</i> (<i>SE</i>)	-0.07 (0.07)		-0.03 (0.07)		-0.09 (0.07)		-0.03 (0.07)	
Age × Sex	<i>B</i> (<i>SE</i>)	0.17 (0.22)		0.20 (0.22)		-0.54 (0.39)		-0.52 (0.39)	
Age × <i>M</i> Ed.	<i>B</i> (<i>SE</i>)	0.09 (0.05)		0.08 (0.06)		0.07 (0.09)		0.07 (0.11)	
Age × Income	<i>B</i> (<i>SE</i>)	-0.07 (0.04)		-0.09 (0.04)*		-0.05 (0.07)		-0.04 (0.07)	
Attachment (Att.)									
Att. category	<i>F</i> (3,)	0.29		0.37		3.96**	.17	2.48	
						B < (A, D)			
A	<i>M</i> (<i>SE</i>)	48.10 (0.67)		47.80 (0.74)		49.60 (0.58)		49.50 (0.64)	
B	<i>M</i> (<i>SE</i>)	47.50 (0.31)		47.70 (0.33)		48.00 (0.27)		48.10 (0.28)	
C	<i>M</i> (<i>SE</i>)	47.80 (0.84)		47.60 (0.90)		48.90 (0.71)		48.90 (0.76)	
D	<i>M</i> (<i>SE</i>)	47.30 (0.57)		47.20 (0.59)		49.50 (0.49)		49.60 (0.50)	
Age × Att.	<i>F</i> (3,)	0.71		0.87		0.06		0.14	
A	<i>B</i> (<i>SE</i>)	0.21 (0.44)		0.36 (0.45)		0.53 (0.79)		0.50 (0.81)	
B	<i>B</i> (<i>SE</i>)	0.09 (0.36)		0.01 (0.37)		0.44 (0.64)		0.34 (0.66)	
C	<i>B</i> (<i>SE</i>)	0.32 (0.49)		0.36 (0.53)		0.41 (0.85)		0.79 (0.91)	
D	<i>B</i> (<i>SE</i>)	0.51 (0.42)		0.44 (0.44)		0.65 (0.74)		0.54 (0.77)	
Parenting (Par.): 15–54 mo.									
Par. <i>M</i>	<i>B</i> (<i>SE</i>)			-0.74 (0.55)				-0.99 (0.48)*	.07
Par. change	<i>F</i> (2,)			2.09				1.12	
Decline (D)	<i>M</i> (<i>SE</i>)			48.60 (0.62)				49.40 (0.54)	
Stable (S)	<i>M</i> (<i>SE</i>)			47.20 (0.46)				49.20 (0.39)	
Increase (I)	<i>M</i> (<i>SE</i>)			49.90 (0.65)				48.50 (0.54)	
Age × Par. <i>M</i>	<i>B</i> (<i>SE</i>)			0.20 (0.26)				-0.28 (0.46)	
Age × Par. Change	<i>F</i> (2,)			0.34				0.677	
Attachment × Parenting									
Par. <i>M</i> × Att.	<i>F</i> (3,)			2.74*				2.36	
				B < (C, D)					
A	<i>B</i> (<i>SE</i>)			-2.20 (1.02)*	.17				
B	<i>B</i> (<i>SE</i>)			-1.94 (0.61)**	.15				
C	<i>B</i> (<i>SE</i>)			1.08 (1.37)	.08				
D	<i>B</i> (<i>SE</i>)			0.10 (0.88)	.01				
Par. Change × Att.	<i>F</i> (6,)			0.70				0.80	
Age × Par. <i>M</i> × Att.	<i>F</i> (3,)			0.86				0.74	
Age × Par. Change × Att.	<i>F</i> (6,)			0.55				1.01	
Parenting Mean × Parenting Change									
Par. <i>M</i> × Par. Change	<i>F</i> (2,)			0.27				1.90	
Age × Par. <i>M</i> × Par. Change	<i>F</i> (2,)			0.25				1.53	

Note. Results for which significant associations involving attachment or parenting obtain are shown in boldface. CBCL = Child Behavior Checklist; ed. = education.

* $p < .05$. ** $p < .01$.

52.4 for the declining group; $M_s = 49.2$ and 49.7 for the stable and increasing groups, respectively). However, the Parenting Mean × Attachment Category interaction, $F(3, 1014) = 4.49, p < .01$, indicates that the association between the mean level of parenting and externalizing behavior varied depending on the child’s attachment category. Figure 1 displays this interaction by showing mean

scores for children in the four attachment groups when parents were 1 standard deviation above or below the sample mean for parenting. In children with A, B, or D attachment classifications, higher parenting scores were associated with lower externalizing ratings, and lower parenting scores were associated with higher externalizing ratings. However, for children with C classifications,

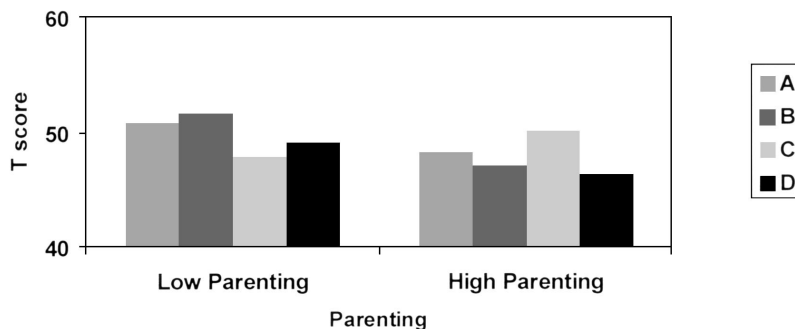


Figure 1. Maternal ratings of children's externalizing problems for each attachment group for children with low and high parenting. Parenting Mean \times Attachment, $F(3, 1014) = 4.49, p \leq .01$; effect sizes: .09–.29.

parenting was not significantly associated with the children's externalizing behavior scores.

Teacher Ratings of Externalizing Problems

On the right side of Table 5, results show that early mother–infant attachment classifications predicted later teacher-rated externalizing behavior problems. In Model 1, teacher-rated externalizing scores were different among the four attachment groups, $F(3, 993) = 2.72, p < .05$. Teachers rated avoidant–attached children as showing more externalizing behaviors ($M = 51.5$) than securely ($M = 49.6$) or ambivalently attached ($M = 49.9$) children.

The analyses in Model 2 indicate that maternal parenting concurrent with and subsequent to the attachment classification accounted for the association between attachment and externalizing behavior observed in Model 1. Teacher ratings of externalizing problems were negatively and significantly related to both the parenting mean, $F(1, 979) = 2.88, p < .001$, effect size = .22, and the parenting change groups, $F(2, 979) = 10.45, p < .001$, effect size = .40. Like mothers, teachers reported more problems when parenting was less responsive and stimulating and when parenting responsiveness declined over time. Children in the declining parenting group showed significantly higher ratings ($M = 52.2$) than did children in the stable ($M = 49.8$) or increasing ($M = 48.6$) parenting groups.

As the interaction in Table 5 between parenting means and attachment scores indicates, the relations between teacher ratings of externalizing behavior and parenting and parenting change were not observed for children from each of the attachment groups equally. Attachment classification interacted with both the parenting mean, $F(3, 979) = 3.14, p < .05$, and parenting change groups, $F(6, 979) = 2.76, p < .05$, and Parenting Mean \times Age, $F(2, 979) = 3.48, p < .05$. These effects are graphed in Figure 2.

Figure 2A shows the interaction between attachment and parenting change groups. The adjusted externalizing score is shown for the three parenting change groups crossed with the four attachment groups. For this figure, the adjusted mean is computed at kindergarten, but the same patterns would be observed at the three ages because the Attachment \times Parenting Change \times Age interaction was nonsignificant. As the figure indicates, children categorized as avoidant, anxious ambivalent, or disorganized at 15 months had more problems if they were in the declining parenting group than if they were in the increasing parenting group. Children

with these A, C, and D attachment categorizations were negatively affected by declining parenting quality, but children with the B attachment categorization were unaffected by declining parental quality. The figure also indicates that when parenting quality increased over time, children in the four attachment groups no longer differed on externalizing scores.

Figure 2B diagrams the interactions between attachment, parenting mean, and age. In this figure, mean scores at kindergarten and first grade are presented for the four attachment categories when the parenting mean is 1 standard deviation below the sample mean (low) and 1 standard deviation above the sample mean (high). In general, children with higher parenting scores tended to score lower on externalizing; children with lower parenting scores tended to score higher. This trend tended to hold over time, with no statistically significant differences over time related to either attachment classification or parenting. The overall level of parenting was a stronger negative predictor of teacher ratings of externalizing for children with disorganized attachment than for children with avoidant or ambivalent–insecure attachments. Indeed, overall level of parenting was not significantly related to teacher ratings of externalizing for the children with ambivalent attachments, and parenting was a significantly weaker predictor for children with ambivalent classifications than for children with secure or disorganized classifications. The Age \times Parenting Mean \times Attachment interaction indicated that overall quality of parenting became a stronger negative predictor of externalizing problems as children with disorganized attachment classifications grew older but did not change reliably over time for other children.

Maternal Ratings of Internalizing Problems

In Table 6 we present the regression analyses for mother and teacher ratings of internalizing problems. For mother ratings, neither attachment nor any of the covariates were related significantly to internalizing in Model 1. Analyses in Model 2 indicate that attachment moderated associations between the parenting mean and internalizing problems, $F(3, 1014) = 2.74, p < .05$. This interaction is diagrammed in Figure 3; mean values are plotted for children in the four attachment groups when the parenting mean is 1 standard deviation below (low parenting) and one standard deviation above the sample mean (high parenting). The parenting mean was a significantly stronger predictor of maternal report of internalizing for B children than for C or D children.

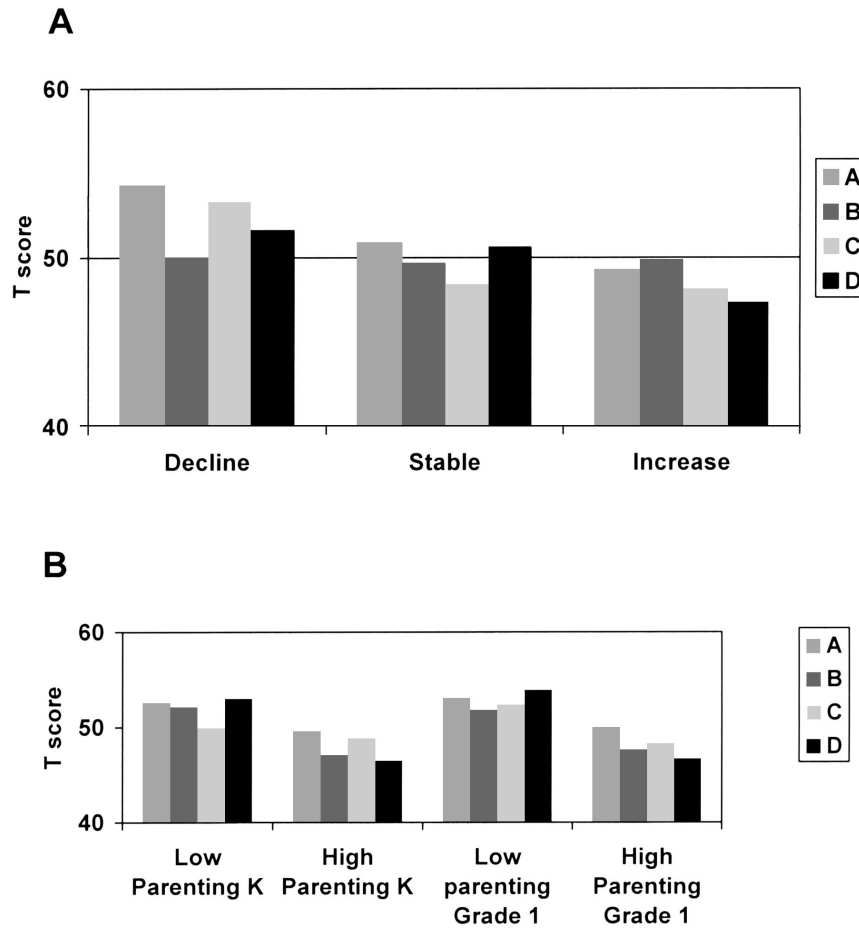


Figure 2. A: Teacher ratings of children's externalizing scores for each attachment group within parenting change groups, $F(6, 979) = 2.76, p \leq .05$. B: Teacher ratings of children's externalizing problems at kindergarten (K) and Grade 1 for each attachment group and for children in different parenting groups, $F(2, 979) = 3.48, p \leq .05$.

Teacher Ratings of Internalizing

Table 6 shows that there were significant attachment group differences in Model 1, $F(3, 979) = 3.96$, effect size = .17, for teacher ratings of internalizing behaviors. Teachers rated children categorized as securely attached lower on internalizing behavior ($M = 48.0$) than they rated ambivalent ($M = 49.6$) and disorganized ($M = 49.5$) children. However, these differences became nonsignificant when parenting was added in Model 2 ($B = -0.99$, $p < .05$, effect size = .07), suggesting that parenting may have partially, but not significantly, mediated the relation over time of early attachment to subsequent internalizing.

Summary

We summarize our findings in Table 7. Taken by itself, early attachment classification appeared to predict child outcome on three of the six measures: mothers' ratings of social skills and teachers' ratings of children's externalizing and internalizing behaviors. However, when parenting quality was entered into the model, the effects of attachment dropped out in each of these cases. For five of the six child outcomes, mean levels of overall

parenting quality and not child attachment significantly predicted child outcome. Changing parenting quality also predicted child outcomes in three of the six cases. Indeed, when parenting declined over time, children scored lower on teachers' ratings of social skills and higher on mothers' and teachers' ratings of externalizing behaviors. The effects of parenting change over time were moderate in effect size, and the effects of parenting mean were small to moderate in size. Attachment moderated the associations between parenting and outcomes for three of the six outcome variables: mothers' ratings of externalizing and internalizing problems and teachers' ratings of externalizing problems. Parenting quality across the 15–54-month age period was less likely to affect externalizing scores in children who were categorized as having ambivalent–insecure attachment to their mothers than in children with other attachment categorizations. More important, declining parenting quality over time was more likely to affect teachers' ratings of externalizing behaviors in insecurely attached children than it was to affect ratings of externalizing behaviors in children who were rated as securely attached in infancy. The effects of parenting quality on teachers' ratings of externalizing behavior became increasingly stronger for children

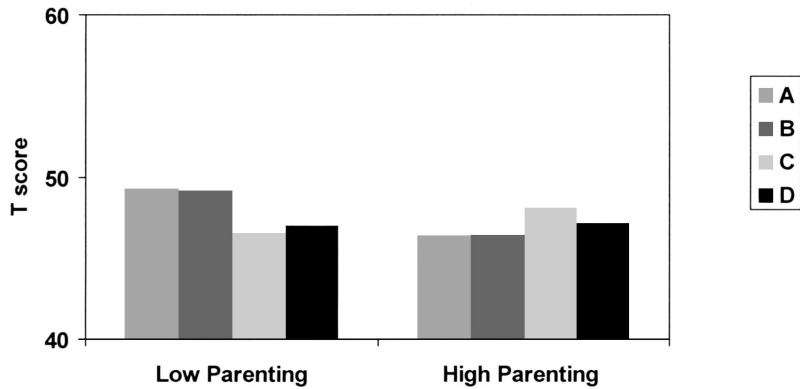


Figure 3. Mother ratings of children's internalizing problems for each attachment group and parenting mean groups, $F(3, 1014) = 2.74, p \leq .05$.

with disorganized styles of attachment as these disorganized children got older. Finally, quality of maternal parenting was more likely to predict mothers' ratings of internalizing behavior in securely attached children than in insecurely attached children.

Discussion

In this study, we examined the association between early infant attachment classifications and children's later social competence and behavior problems in more than 1,000 U.S. children throughout preschool, kindergarten, and first grade. In particular, we examined how children with differing attachment histories responded under conditions of stable or changing maternal parenting quality. Our findings increase understanding of the effects of early attachment, and they both support and extend attachment theory.

In support of attachment theory, early attachment classifications at 15 months predicted either mothers' or teachers' ratings of the three children's social behaviors measured several years later during the transition to school. First, children classified as avoidantly attached to their mother in infancy were rated by their mothers as less socially competent from 54 months through first grade than were children classified as securely attached. Second,

children classified as avoidant were later rated by their teachers as higher on externalizing behavior than were children who had been earlier classified as secure or anxious-resistant. And third, children who had been classified as avoidant or disorganized were also rated by their teachers as showing more internalizing behaviors than other children. These findings replicate and extend the findings of other researchers who have suggested that infants classified as avoidant and disorganized are at risk for later behavior problems compared with infants classified as secure.

At the same time, had this research only examined early attachment classification and not looked at subsequent changes in parenting behavior, the effects of intervening parenting behavior would have been missed. When we controlled for the effects of parenting between 15 and 54 months of age in our analyses, main effects of early attachment on later social competence and externalizing behavior disappeared. Parenting, rather than early attachment classifications, predicted mother-rated and teacher-rated social competence, mother-rated and teacher-rated externalizing scores, and teacher-rated internalizing scores. These findings support a mediational model of the effects of early attachment on later development, and they support earlier views—such as those of

Table 7 Findings Summary

Variable	SSRS		Externalizing		Internalizing	
	Mother	Teacher	Mother	Teacher	Mother	Teacher
Attachment category	A < B ^a		A > B, C ^a		A, D > B ^a	
Parenting mean	Positive		Negative		Negative	
Parenting change category	D < S, I		D > S, I		D > S, I	
Interactions with attachment category			Att. × Ch. ^b		Att. × M ^c	
			Att. × Ch. ^d		Att. × M × Age ^e	

Note. SSRS = Social Skills Rating System; D = declining; S = stable; I = increasing; Att. = attachment category; Ch. = change. ^a Effects dropped out in Model 2 when measures of maternal parenting quality were included in the regression analyses. ^b For children categorized as A, B, or D, higher parenting scores were associated with more externalizing. However, for children in the insecure-ambivalent (C) attachment category, parenting was not associated with externalizing ratings. ^c For children categorized as securely attached (B), parenting had a stronger effect on internalizing than it did for other children. ^d Children in the insecure attachment categories of A, C, and D were negatively affected by declining parenting. Children categorized as secure were not affected by declining parenting. ^e Parenting became a stronger negative predictor of externalizing problems for children categorized as disorganized (D) as they grew older; the effects of parenting on externalizing did not change reliably over time for other children.

Maccoby (1980) and Lamb and Bornstein (1982, 1987)—that the continuity between attachment in infancy and subsequent social development may be accounted for by continuity in the environment. These findings are congruent with those Belsky and Fearon (2002a) reported, using the same data set to predict child outcomes when the children were 3 years of age.

Changing parenting behaviors between 15 and 54 months of age may have been what enabled children with early insecure attachments to change the otherwise projected trajectories. When mothers' quality of parenting improved over time, children with insecure attachments in infancy showed fewer externalizing behaviors (as reported by their teachers) than did children with insecure attachments who received stable or declining qualities of parenting. When parenting quality declined over time, the children with insecure infant attachments were reported by teachers to have higher levels of externalizing problems than insecure children who received improved qualities of parenting over time. Whether this change presupposed changes in internal working models of self and others or the children simply received support in acquiring better social skills and more optimal ways of resolving conflicts we do not know. What we can say is that the behavior of children with earlier classifications of insecurity appeared to change in the direction of increased social competence and reduced externalizing behavior when parenting improved.

These data also extend understanding of attachment theory by showing how the pattern of attachment behavior developed in infancy relates to how a child experiences subsequent parenting. For three of the six outcome variables, children's early attachment categorization moderated the effects of parenting quality between 15 and 54 months for several of the outcomes under consideration—mother-rated externalizing and internalizing scores and teacher-rated externalizing behaviors. Children with different early attachment categorizations responded differently to changes in maternal parenting. In some respects, then, these data suggest that children with secure and insecure attachment histories seem to be differentially susceptible to rearing experiences subsequent to their initial attachment assessment (see Belsky, 1997, 2005), with children with insecure histories manifesting greater susceptibility and children with secure histories manifesting lesser susceptibility, at least with respect to the developmental outcome of externalizing problems.

In particular, for children with early secure attachments with their mothers, declining parenting quality was not associated with increased classroom externalizing problems, as it was for children with insecure attachments at 15 months of age. This suggests that there may be continuing effects of early secure attachment that can be observed even when parental conditions change. These findings are consistent with a dynamic process model of the continuing effects of early attachment. Although securely attached children did not seem to gain from improved parenting quality, they also appeared to be protected against declining maternal parenting, suggesting that early attachment may have served as a protective factor against declines in optimal parenting. These data are also in line with findings reported by Belsky and Fearon (2002a) showing that security protected against the adverse effects of cumulative contextual risk on child functioning at 36 months of age.

It could be argued that the reason declining parenting quality did not predict increased externalizing behaviors in securely attached children was that within securely attached dyads, parenting behav-

ior did not decline as much as it did for insecurely attached children, whose parents were already lower to begin with. To test this possibility, we looked at whether changing parenting had a differential impact depending on the overall level of parenting responsiveness. The interactions between parenting and attachment were observed even when we allowed the association between parenting change and child outcomes to differ depending on the overall level of parenting. Thus, secure attachment appears to be a protective factor against declining parental behavior, and early insecure attachment may serve as a risk factor for increased externalizing behavior in preschool, kindergarten, and first grade.

For securely attached children, secure attachment and the concomitant hypothesized internalized working models may enable them to approach social situations with positive views of themselves and optimal expectations from others. Even when their mothers decrease in sensitivity, these children may be able to extract from the situation the information that is positive and that enables them to respond positively to themselves and others. The secure child may internalize positive views of self and others and may be somewhat less vulnerable to declining sensitive parenting than the insecure child, for whom insensitive parenting may confirm their more negative expectations of others and their evaluation of self. Not likely to interpret negative events and experiences as feedback on their own selves, securely attached children may be able to reach out to other adults for support and assistance. Able to express their emotions directly, these children may be less likely to act out their hostility toward themselves or others. There is even some data to suggest that children who are securely attached in infancy develop subtle psychophysiological and emotion-regulation abilities that enable them to be less reactive to declines in emotional support from parents and the stresses of social interactions with peers (Schuder & Lyons-Ruth, 2004). In any of these ways, securely attached infants may be somewhat protected against the effects of declining parental responsiveness. Not inconsistent with this line of reasoning is evidence showing that, at least at age 3, children with secure attachment histories remember positive events (presented in an experimental puppet show) more than negative events, whereas the reverse is true of children with insecure attachment histories (Belsky et al., 1996).

The effects of parenting changes over time are particularly interesting for the children who were categorized at 15 months as having had disorganized maternal attachments. These children showed perturbations at 15 months in responding to parental separation and reunion. For these children, we found that overall level of parenting became an increasingly stronger predictor of teacher ratings of externalizing over time from 54 months through first grade. To the extent that disorganized attachment results from having a parent who is troubled, fearful, or in mourning (Cassidy & Mohr, 2001; Main & Hesse, 1990) and who may behave in a fashion that is unpredictable and possibly frightening to the child, it is not surprising that as time "heals"—or when conditions for the mother change—so too can the child's behavior in relation to others increasingly deviate from the otherwise predictable trajectory. The finding that children with insecure-ambivalent attachments did not share the beneficial effects of increasing parental quality, compared with children from other attachment groups, might reflect the difficulties ambivalently attached children may have noticing changing parental quality against a historical background of inconsistent early responsiveness. Parents of children

with insecure–ambivalent classifications are noted for their inconsistency (Cassidy & Berlin, 1994).

These findings partially replicate and extend the findings of other researchers who have suggested that infants classified as avoidant and disorganized are at risk for later behavior problems compared with infants classified as secure. Our findings, however, are more consistent for children with the avoidant classification. What is surprising is that having a disorganized classification does not, as a main effect, appear to place a child at greater risk for poor outcomes than does having other insecure classifications. Although it is widely speculated that disorganized attachment is the most risky attachment classification compared with other “organized” insecure (avoidant or ambivalent) classifications, and although it is considered a possible marker for the development of psychopathology (e.g., Belsky, 1999; Claussen, Mundy, Mallik, & Willoughby, 2002), our findings suggest that disorganization may be remediable with changing maternal circumstances. In this and in other analyses of this relatively low-risk sample, we have not found the infants classified as disorganized to be at generally higher risk (e.g., Belsky & Fearon, 2000b; McElwain et al., 2003).

We wonder whether the empirical literature is as consistent in regarding the consequences of disorganized attachment as is commonly assumed. Although a bit dated now, a meta-analysis of 12 studies reported by van IJzendoorn et al. (1999) found a modest correlation between the disorganized classification and externalizing behaviors ($r = .29$). However, in half of these studies, researchers assessed attachment status contemporaneously with the measurement of problem behaviors during the preschool period, quite a different approach than predicting to later behavior from prior classifications collected during infancy. In the preschool years, the disorganized classification is not primarily disorganized–disoriented behavior but controlling behavior, which shares obvious symptoms with externalizing behavior (Moss, Cyr, & Dubois-Comtois, 2004). Further, five of the six studies in the meta-analysis assessing infant attachment and preschool externalizing behavior involved low-income samples (average $r = .35$). The single study with middle-income families had the lowest effect size of the five ($r = .17$).

An important qualification emerges from this look at the meta-analysis and applies to the present study, which included relatively small numbers of children that could be considered at high risk. The Greenberg (1999) model, and a developmental psychopathology approach in general, propose that it is attachment insecurity in combination with other adverse factors, and not insecure attachment per se, that probabilistically increases the risk for conduct problems or other psychopathology (Greenberg, Speltz, & DeKlyen, 1993; Sroufe et al., 1999). However, in the NICHD sample, it did not appear that the infants classified as disorganized were significantly different from either the secure or other insecure groups on demographic risk and parenting risk. In contrast, infants with avoidant classifications were clearly different from infants with secure and insecure–ambivalent classifications on demographic risk and parenting risk. It is noteworthy, also, that for infants with disorganized or unclassifiable classifications, approximately half (46%) had forced secure classifications, and nearly a third (27%) had a forced ambivalent classification. Thus, in this sample, a disorganized categorization was not accompanied by a great deal of avoidant behavior, and it is avoidance that was most

associated with both parenting and demographic risk as well as problematic outcomes in this sample.

We also found that the parenting mean was a significantly stronger predictor of maternal report of internalizing for secure children than it was for ambivalent or disorganized children. This could reflect the possibility that our measure of parenting was a more reliable measure in general for parents of children with secure classifications compared with parents of children with ambivalent and disorganized classifications. The brief parenting observation sample may not be sufficiently long or complex to detect those characteristics that are associated with these insecure classifications. For example, the disorganized classification is associated with parenting that includes frightening or frightened behaviors (Lyons-Ruth, Bronfman, & Atwood, 1999; Schuengel, Bakermans-Kranenburg, & van IJzendoorn, 1999), and these may not show up in a family visit and parenting interaction. Such behavior may occur with low frequency in more unscripted situations. Most of the children with disorganized classifications had secondary secure or ambivalent classifications, and their parents may not, in the brief assessment, have differed so very much from parents of children with primary secure or ambivalent classifications.

It is interesting, and perhaps surprising, that for many children changes in parenting quality may be more important than the absolute level of parenting quality. In three instances—teacher ratings of social skills and mother and teacher ratings of externalizing scores—we found that parenting quality change was more strongly associated with child outcome than the mean level of parenting quality. Moreover, when parenting quality declined, the effects of overall parenting were less predictive than when parenting quality stayed stable or increased. This result suggests that children are not responding to absolute levels of parenting quality but to changes in relative levels over time. Children may feel more comfortable or more scared when parents are becoming more or less responsive, and thus, the trajectory of parenting quality may be more influential than the absolute quality of parenting over time. As a point of interest, we are aware of no existing theories of parental influence that anticipate such a result. Although developmentalists who focus on differential treatment of siblings by parents have highlighted the importance of the parenting children experience relative to that experienced by a sibling, no one to our knowledge has highlighted the influence of parenting experienced at one point in time relative to that experienced at another (i.e., earlier) point in time.

A strength of this study is the use of teachers' reports as well as mothers' reports of child outcome. Although mothers might be aware of many aspects of the child's behavior, they may have less experience than teachers in rating children relative to other children. Teachers not only have broader experience with different types of children, they also see children in circumstances that require children to adjust to peer and school demands on their own without the support of familiar family circumstances. More significantly, mothers may have a self-report bias that could be confounded with both their parenting skills and the child's attachment status. Thus, not only are teachers more likely to be accurate reporters of children's behaviors with others, their reports are also more likely to be independent of parenting behaviors and child attachment. Nevertheless, mothers' and teachers' reports yielded similar findings in the areas of social skills and externalizing

behaviors. Teachers' reports yielded additional findings in the area of internalizing and findings that revealed interactions with the child's early attachment categorization. The congruency in the findings using teacher and mother reports adds to the confidence with which these results can be interpreted. That teacher reports yielded findings beyond those found using maternal reports suggests that teachers may be more sensitive reporters in the arena of behavioral problems, capturing more subtle individual differences related to externalizing and internalizing behaviors outside the home.

An important question that is not entirely addressed in this report concerns the factors that may affect increasing or decreasing maternal parenting quality (but see Belsky & Fearon, 2002b, for related data at age 24 months). Although answering this question goes beyond the focus of this report, information used to validate the measure of maternal parenting may be informative. Recall that parenting changes were associated with changes in family income and maternal depression (and see also NICHD ECCRN, 2003). These earlier findings merit further exploration and suggest specific approaches to address early attachment problems. Specific interventions to remediate parental insensitivity have already been shown to be effective (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). The results presented here suggest that the effects of parents' early problems in responding to their young infants may be reversible when parenting behavior is itself changed.

Some might wonder whether children's departures from anticipated trajectories under conditions of improved parenting quality might reflect an early form of "earned security" (Hesse, 1999). Such a possibility seems an overinterpretation for children at this cognitively immature stage of development. Earning security may require a kind of reflection on experiences and a reorganization of attachment models that may be beyond the cognitive capabilities of children during the preschool and early school years.

Study Limitations

These findings are limited in a number of ways. First, although the study sample was large and diverse, it was not a nationally representative sample, and children from low-risk, healthy families were overrepresented. In particular, scores on the externalizing and internalizing scales were generally within the normal range, and the changes with time, although significant, were modest to moderate in magnitude. Although our discussion has focused on the relations between children's attachment and maternal parenting changes, and we have often implied that children's behaviors are responsive to parental changes, it is not only impossible to ascertain the direction of these effects, it is naive. Both child and parent are in a dyadic system, and children's behavior is as much of an elicitor of parental behavior as a response to it. Hence, caution is needed in interpreting these findings.

Conclusion

These findings provide support for the effects of attachment in infancy on children's subsequent social development and a greater understanding of trajectories from early attachment under conditions of changing parental caregiving quality. The findings suggest that there may be benefits of early secure attachment in the form of protection from the negative effects of declining quality of

parental caregiving. At the same time, there is evidence supporting hope for children with histories of insecure or disorganized attachment when their mothers become more sensitive and responsive over time.

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