

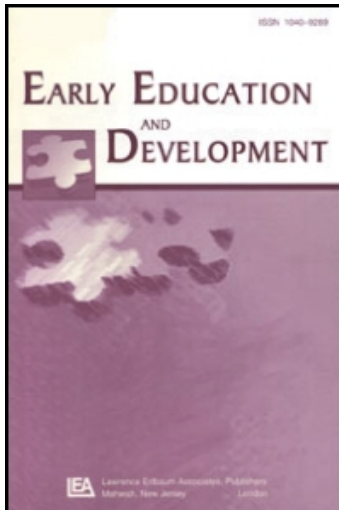
This article was downloaded by: [Roggman, Lori A.]

On: 11 December 2009

Access details: Access Details: [subscription number 917718678]

Publisher Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Early Education & Development

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t775653644>

### Keeping Kids on Track: Impacts of a Parenting-Focused Early Head Start Program on Attachment Security and Cognitive Development

Lori A. Roggman <sup>a</sup>; Lisa K. Boyce <sup>a</sup>; Gina A. Cook <sup>b</sup>

<sup>a</sup> Family, Consumer, & Human Development, Utah State University, <sup>b</sup> Early Intervention Research Institute, Utah State University,

Online publication date: 11 December 2009

**To cite this Article** Roggman, Lori A., Boyce, Lisa K. and Cook, Gina A.(2009) 'Keeping Kids on Track: Impacts of a Parenting-Focused Early Head Start Program on Attachment Security and Cognitive Development', *Early Education & Development*, 20: 6, 920 – 941

**To link to this Article:** DOI: 10.1080/10409280903118416

**URL:** <http://dx.doi.org/10.1080/10409280903118416>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

# Keeping Kids on Track: Impacts of a Parenting-Focused Early Head Start Program on Attachment Security and Cognitive Development

Lori A. Roggman and Lisa K. Boyce  
*Family, Consumer, & Human Development*  
*Utah State University*

Gina A. Cook  
*Early Intervention Research Institute*  
*Utah State University*

*Research Findings:* The home-based Early Head Start program in this local study aimed to promote children's early attachment and cognitive development by establishing supportive relationships with parents and guiding responsive parenting and positive parent-child play interactions. To test the effectiveness of this approach, we studied the development of secure base behavior and cognitive skills in infants and toddlers from low-income families in northern Utah and southern Idaho who had been randomly assigned to the program or a comparison group. Analyses covaried the main risk factors of low maternal education (associated with the children's lower cognitive scores) and maternal depression (associated with both lower cognitive scores and lower attachment security scores). Significant impacts of this Early Head Start program over and above earlier assessments and risk variables were evident by 18 months in children's attachment security scores and by 36 months in children's cognitive standard scores. *Practice or Policy:* The results of this study support the effectiveness of focusing on parenting to support children's early development. Home-visiting programs such as this one can keep children's early development on track by

providing parenting-focused home visits that help parents support their children's early development.

Early Head Start interventions take place over the first 3 years of life when development is rapid but vulnerable to the environment, and young children often need support for their development to stay "on track" (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; Ramey & Ramey, 1998; Schweinhart & Weikart, 1989). The second year of life is particularly critical for this support and thus for intervention, because during that time important features emerge in development, and developmental trajectories become differentiated between children in different environments (Black, Hess, & Berenson-Howard, 2000; Rutter & Rutter, 1993; Vaughn, Egeland, Waters, & Sroufe, 1979). Two of these features are attachment security and cognitive development, both of which are vulnerable to the effects of living in poverty (Diener, Nievar, & Wright, 2003; McLoyd, 1998). The randomized design of the Early Head Start Research and Evaluation Project (Administration for Children, Youth, & Families, 2002) allowed for a robust test of the impact on these features within one Early Head Start program with a specific parenting-focused approach.

Children from impoverished circumstances are at risk for various problems in early development and become increasingly at risk, as they get older, for problems in their schools and communities (Brooks-Gunn & Duncan, 1997; Cunningham & Stanovich, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994; Korenman, Miller, & Sjaastad, 1995; McLeod & Shanahan, 1993; McLoyd, 1998; National Institute of Child Health and Human Development Early Child Care Research Network [NICHD/ECCRN], 2005). Children in poverty have more social-emotional problems (Brooks-Gunn & Duncan, 1997; McLoyd, 1998) and a higher incidence of insecure attachments compared with those living in middle-income homes (Bakermans-Kranenburg, van IJzendoorn, & Kroonenberg, 2004; Diener et al., 2003). Poverty is also associated with poor cognitive development, developmental delays, learning disabilities, and several indices of low academic achievement, such as repeating a grade or not completing high school (Brooks-Gunn & Duncan, 1997; Duncan & Brooks-Gunn, 2000; McLoyd, 1998). Poverty seems to set up "trajectories that are difficult to alter ... [and that] diverge further and further over time" from the trajectories of other children (Votruba-Drzal, 2006, p. 1164). These different trajectories are clear and persistent by school entry (Burchinal et al., 1997) but first become apparent between 12 and 30 months, after the first year of life but before most preschool programs begin, and diverge by almost a full standard deviation from national age norms (Black et al., 2000).

Of particular concern is the impact of poverty on the mother-child relationship, because this first relationship and the quality of the attachment that forms within it

provide a child with concepts of what close relationships will be like, and it is with these expectations that a child enters into other social interactions (Bowlby, 1982, 1988). The financial and emotional stress associated with poverty negatively affects maternal behaviors such as sensitivity and responsiveness while increasing negativity and intrusiveness (Aber, Jones, & Cohen, 2000; Shaw & Vondra, 1995). These aspects of early parenting behavior put children at risk for developing insecure attachments (Jacobsen, Edelstein, & Hofmann, 1994; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; van den Boom, 1994; Zeanah, Boris, & Larrieu, 1997).

Whether a child develops a secure or insecure attachment early in life influences the formation of other social relationships and the development of social competence (Culp, Hubbs-Tait, Culp, & Starost, 2001; Hubbs-Tait, Culp, Culp, & Miller, 2002; Seifer & Schiller, 1995). Attachment relationships vary, but a sense of security fosters the trust and communication needed for developing social competence and forming future positive social relationships (Ainsworth, Blehar, Waters, & Wall, 1978; Weinfield, Sroufe, Egeland, & Carlson, 1999). During the preschool and early school years, securely attached children, compared with their insecurely attached peers, have fewer behavior problems, better self-concepts, more social confidence, greater social participation, better social problem-solving abilities, higher sociometric status as indicated by more children naming them as friends, and more competence in social situations (Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Colman & Thompson, 2002; Erickson, Sroufe, & Egeland, 1985; Frankel & Bates, 1990; LaFreniere & Sroufe, 1985; Moss & Gosselin, 1997; Seifer & Schiller, 1995; Turner, 1991). Attachment security may also mediate negative parenting behaviors often associated with maternal depression and children's developing representations of themselves and their parents (Toth, Rogosch, Sturge-Apple, & Cicchetti, 2009). The influence of attachment security on early cognitive development is inconclusive, with some research indicating that secure attachment supports early cognitive development (Meins, Fernyhough, Russell, & Clark-Carter, 1998) and other research failing to find evidence of a relation of early attachment with cognitive development or with intelligence later in childhood (Belsky & Fearon, 2002; van IJzendoorn, Dijkstra, & Bus, 1995).

The developmental challenges facing children in families living in poverty may be associated with parenting difficulties because of risks that are more prevalent in low-income families, including low maternal education and high maternal depression (Reading & Reynolds, 2001). Low maternal education is associated with less positive parenting more generally (Fox, Platz, & Bentley, 1995). Maternal depression has persistent negative effects on attachment (Toth et al., 2009), undoubtedly from its association with the insensitive and unresponsive caregiving underlying insecure attachment (Lyons-Ruth, 1992; Teti, Gelfand, Messinger, & Isabella, 1995). Although both maternal depression and low maternal education have been documented as developmental risk factors, depression is more likely to predict

children's later behavioral problems, and maternal education is more likely to predict children's poor cognitive functioning (Brennan et al., 2000). Because of the importance of the first 2 years of life for both of these outcomes—that is, attachment security (Ainsworth et al., 1978; Bowlby, 1988) and cognitive development (Black et al., 2000)—this is a particularly important time in life for supporting parenting among families in poverty. Unfortunately, these risk factors may also reduce the effectiveness of interventions if depressed or poorly educated mothers are less responsive to program services. Thus, program impacts could be moderated by these characteristics.

### An Early Head Start Home-Based Program

Clearly, young children who live in impoverished circumstances in the early years are at risk for developmental trajectories that diverge from those of their more advantaged peers. The primary goal of the particular home-visiting program in this study was to reduce the potential effects of poverty by helping parents provide the responsiveness and stimulation that promote children's early development. Bear River Early Head Start provided comprehensive services for low-income pregnant women and families with infants and toddlers in three rural counties in northern Utah and southern Idaho. The goal of the program was to improve children's developmental outcomes through a two-generation model by helping parents provide more of the experiences infants and toddlers need for developing attachment security and cognitive skills. The program was designed to provide child and family development services in weekly home visits and socialization groups for parents and children. Staff members worked to foster positive parent-child interactions, to enhance parents' understanding of their children's development, to encourage parents to engage in activities with their children that promote development, and to help families access needed services in the community.

The Bear River Early Head Start program's approach was based on an assumption that child development can be supported by helping parents improve the quality of their parenting interactions (e.g., Bakermans-Kranenburg, van IJzendoorn, & Bradley, 2005). Parents in Bear River Early Head Start were guided to read their infants' cues, respond to their physical and emotional needs, and enjoy playful interactions with them. These aspects of parenting were emphasized because the program's theory of change, or assumptions about expected outcomes and effective strategies, incorporated the premise that secure attachment and playful exploration are important for early social and cognitive development. In the program's theory of change, the primary goal was to "strengthen families of infants and toddlers by promoting positive infant-parent interaction" (Roggman, Cook, & Jump, 2000, p. 6). The program's primary objectives for parents included more positive parent-infant play interactions, more nurturing and responsive parenting, and more knowledge about child development.

In the context of weekly home visits with a home visitor, or *family educator*, the main intervention strategy was to spend at least three fourths of the visit time directly facilitating responsive parent–child play interactions to enhance the parent–child relationship and thereby promote child development. Specific strategies used to promote positive infant–parent interaction included highlighting positive aspects of activities, pointing out the infant’s response to the mother, encouraging the mother’s response to the infant, asking the parent about the infant’s interests and abilities, and discussing concepts of development specific to the infant’s emerging abilities (Roggman, Boyce, & Innocenti, 2008; Roggman, Cook, & Jump, 2000). These strategies were believed to help the parents become better able to support their children’s early development, and, as a result, the children enrolled in the program were expected to become smarter and more secure than those not enrolled in the program. Home visits were planned in collaboration with parents, individualized to family needs, used primarily household materials, and adapted to the changing needs and development of the family. The flexibility, individualization, and focus of these visits were thought to be particularly helpful for parents with depression or limited education because they received information at a basic level and were directly supported in their interactions with their children.

Treatment fidelity observations conducted over 3 years of program implementation showed that home visitors became increasingly competent in facilitating parent–child interactions and that parents were engaged during their videotaped home visits (Roggman, Boyce, Cook, & Jump, 2001; Roggman et al., 2000). During this same time, parents strongly agreed with statements indicating that their home visits were different for them than for some other families, helped them to take better care of their babies, helped them to reach their goals, and changed as their needs changed (Roggman et al., 2000).

This study examined the impacts of a parenting-focused home-visiting intervention on two critical outcomes of early development: cognitive skills and attachment security. To test whether children enrolled in Bear River Early Head Start were more developmentally on track as a result of being in the program, we examined how enrollment in this Early Head Start program influenced children’s development, given earlier development and risk factors. Tests of the impact of Bear River Early Head Start that control for early developmental assessments and identified risk variables can show whether the developmental trajectory is different for children in Early Head Start than for children in the comparison group. Our approach adds to the National Early Head Start evaluation by examining intervention, early attachment and cognitive development, and specific risks together to evaluate impact of a program that emphasizes positive parent–child interaction as a protective mechanism for infants and toddlers living in poverty. At this age, children typically have few resources outside of the home, so they are more vulnerable to family factors, such as maternal depression or poor maternal education, that are

negatively associated with child development (NICHD/ECCRN, 1999; Reyna, Schulz, & Laird, 2007; Teti et al., 1995). These and related risk factors were included in this study and tested as potential moderators of the impact of the program on children's development.

## METHODS

In collaboration with the national multisite Early Head Start Research and Evaluation Project (Administration for Children, Youth, & Families, 2002), Bear River Early Head Start initiated an experimental evaluation of the impact of their program in partnership with a local research team. The program served families in a semirural area; some families resided in a small city, and others resided in either small towns or isolated farmland areas. The program staff recruited all families, including those randomly assigned to a comparison group.

### Participants

Two hundred families (excluding one child who died) were initially recruited into the local study and randomly assigned to either the Early Head Start program or a comparison group. Data were collected from 85% of these families when the children were 14 months old, 80% when they were between 18 and 24 months old, and 78% when they were 36 months old. The final research sample used for analyses of child outcomes included 161 families from whom data were collected at critical age points: attachment security data at 18 months and cognitive development data at 24 or 36 months. Although sample attrition was higher among families in higher risk groups, there were no differences in baseline demographics or maternal risk variables between program and comparison groups in the final research sample. The descriptors for the final research sample did not differ from the descriptors of the baseline sample. In addition, the final research sample showed no statistically significant differences between program and comparison groups on baseline characteristics. In the Early Head Start program group, families who continued to receive services for the entire time for which they were eligible, compared with those who did not, tended to enroll when their children were a couple months older and when the mothers were in their 20s. There were no other baseline differences related to research sample attrition or program withdrawal.

The research participants recruited were either pregnant or already mothers with infants younger than 10 months old. To meet program requirements, more than 90% of participants were low income, as defined by federal poverty guidelines. Additional family characteristics and demographics measured at the baseline assessment are shown in Table 1. These baseline demographic variables reflect the population served by Bear River Early Head Start: families who, though

TABLE 1  
Maternal and Family Characteristics ( $n = 154-160$ )

<i>Characteristic</i>	<i>M</i>	<i>Range</i>	<i>SD</i>
Mothers not living with husband or partner (%)	28		
On public assistance (%)	32		
Less than a high school degree (%)	24		
Unemployed (%)	21		
Minority (%)	18		
Teen mothers (%)	30		
Annual income (\$)	10,264	0-50,000	7,834
Maternal age (years)	22.84	14-44	5.27
Maternal education (years)	12.32	3-16	2.37
Number of children	1.92	0-7	1.35

not ethnically very diverse (82% Euro-American), varied widely in other characteristics such as maternal age and family size.

## Procedures

Data collected for the national evaluation were also used for local research. These data were from family program applications completed by program staff and from parent interviews and child assessments conducted by trained data collectors at child ages 14, 24, and 36 months. Additional data used for this study were taken from local measures added to the interviews and assessments at the above time points and also from local interviews with mothers before random assignment and again when the infants were 10 and 18 months old.

Data collectors were initially trained by researchers at the national research site, Mathematica Policy Research (MPR), in a week-long training session. Subsequently, data collectors were required to be "certified," that is, to meet a criterion level of accuracy prior to collecting national data. Subsequently, to be "re-certified," data collectors periodically videotaped themselves collecting data with research families for continued checks of procedural accuracy. This process also served as training for local data collection procedures, because local and national data collection involved the same procedures. Training for various parts of the study varied by type of procedure. For parent interviewing, data collectors were required to practice interviews with other data collectors and non-research families to become fluent with the wordings and skip patterns prior to collecting data from research participants. For child testing, test administration was practiced to ensure accuracy in wording, placement of toys, and timing of the test. Each data collector practiced on several children and then videotaped a testing session to send to MPR



for certification. Adequate reliability scores on two practice tapes were required for certification.

## Measures

*Cognitive development.* The measure of child cognitive skills in the multi-site study was the Bayley Scales of Infant Development—II Mental Development Index (MDI; Psychological Corporation, 1993), which was used at child ages 14, 24, and 36 months. Within this local sample, internal consistency of the items in the total cognitive score as measured by Cronbach's alpha was adequate at all three ages: 14-month  $\alpha = .79$ , 24-month  $\alpha = .85$ , and 36-month  $\alpha = .99$ . Standard scores were used in this study because they took into account the different number and type of test items at different ages, because they could be interpreted in relation to population norms, and because our emphasis was on divergence from expected developmental outcomes rather than changes in raw scores.

*Attachment security.* Attachment security was measured at this site with the Attachment Q-Set (AQS; Waters, 1987a), which was completed by the mothers with assistance from a trained interviewer at child ages 14 and 18 months. Prior to the in-home interview, mothers were asked during a phone interview to rate each of the 90 items from the AQS (Waters, 1987a) in terms of how typical each behavior was of their child. To increase the reliability of these mothers' Q-sorts, researchers conducted a phone interview 1 to 3 weeks prior to the in-home assessment to familiarize the mothers with the items and to provide them with additional time to think about their child's behaviors and to observe their child. Test-retest reliability of the measure in this study, based on scores derived from the initial ratings during the phone interviews and the ratings from the card sort during the in-home assessments, was acceptable ( $r = .64$ ), despite the fact that scores from the interview ratings were on a 3-point scale and scores from the full card sort were based on sorting the item cards into nine piles and therefore were on a 9-point scale. Although the AQS was initially developed for use by trained observers, mothers who have prior familiarization with and explanation of the AQS items can provide reliable AQS scores representing attachment security (Teti & McGourty, 1996; Waters & Deane, 1985), whereas mothers without familiarization and explanation cannot (van Dam & van IJzendoorn, 1988). Predictive validity has also been demonstrated, with strong correlations between observers' ratings of maternal sensitivity and maternal sorts on AQS attachment security 4 months later (Pederson & Moran, 1995). The possibility of response bias is reduced by the focus on specific secure base behaviors that are not necessarily viewed as socially desirable (e.g., "Child keeps track of mother's location when he plays around the house") and by the use of "filler" items that, according to the measure author, make the focus on security less obvious (Waters, n.d.).

During the preassessment phone interview, mothers were offered a detailed explanation of the items and were encouraged to watch those behaviors for the next 1 to 3 weeks. This preinterview provided mothers with familiarity with the items, an opportunity to ask about the items, and time to observe their children. During the in-home interviews and assessments, parents sorted the 90 behavioral descriptions, which were individually printed on cards, according to how well each item described their child. The interviewer guided the mother to first sort the cards into three piles according to which characteristics were like, not like, or neither like nor unlike their child. The interviewer then helped the mother sort each of those piles into three more piles according to, for example, which characteristics were like, much like, and very much like their child. These are the procedures recommended by the author (Waters, n.d.).

The AQS Q-sort criterion correlation score was used for the analyses reported here. The Q-sort item criteria were developed from the scores of 16 experts, developmental psychologists who provided security sorts for an "ideal" securely attached child. The reported reliability of these composite scores was .95 or higher (Waters & Deane, 1985). To derive a score, item values based on the card sort are correlated with the item criteria. Thus, the more similar the child is to a hypothetical "most secure child," the higher the criterion correlation score, resulting in a score ranging from  $-1.0$  to  $1.0$ , with  $1.0$  representing the most secure. In practice, the scores typically range from  $-.50$  to  $.80$  (Waters, n.d.).

*Risk factors.* Additional risk factors were examined in relation to the two primary hypothesized outcomes. These risk factors included factors that could affect children's early development, including maternal depression, education, age, employment, and family income (even within this low-income sample, family income varied). Questions regarding maternal depression were from the Center for Epidemiologic Studies–Depression scale (CES-D; Radloff, 1977) and were asked during baseline telephone interviews with mothers after program application but before randomization and program enrollment. Reliability for this measure was reported by the author as Cronbach's  $\alpha = .92$ , and local reliability for this study was estimated as Cronbach's  $\alpha = .91$ . All other risk variables were collected from program application forms before randomization and program enrollment.

## RESULTS

To examine the impacts of this Early Head Start program on children's attachment security and cognitive development, we tested a series of regression models in which risk factors, earlier child assessment data, and Early Head Start enrollment were used to predict targeted outcomes and test continuous risk variables as moderators of program impact. The first step in our analyses was to examine potential

risk factors related to each of the primary outcomes (i.e., attachment and cognitive development).

### Risk Factors

Of the risk variables that were examined, both maternal depression and maternal education were significantly correlated with attachment security. Maternal depression scores on the CES-D were negatively associated with AQS security scores at both 14 months ( $r = -.22, p < .01$ ) and 18 months ( $r = -.26, p < .01$ ). Maternal education was positively associated with AQS security scores at both 14 months ( $r = .17, p < .05$ ) and 18 months ( $r = .31, p < .001$ ). None of the analyzed risk factors were related to cognitive development at 14 months, but maternal education predicted cognitive development at later ages. Maternal education was positively associated with Bayley MDI scores at both 24 months ( $r = .24, p < .01$ ) and 36 months ( $r = .29, p < .01$ ). Thus, the strongest risk factors for low security were high maternal depression and low maternal education, and the strongest risk factor for poor cognitive development was low maternal education. These risk factors were then included in later models predicting attachment and cognitive outcomes.

### Attachment Security

Attachment security scores, shown in Table 2, varied in this sample similarly to the expected range (Waters, n.d.). Hierarchical multiple regression was used to determine the magnitude of influence from participating in Early Head Start beyond the effects of early development and risk. Baseline CES-D scores, years of maternal education, and 14-month AQS security scores were entered into the first block and treatment group (dummy coded) into the second block of a multiple regression model with 18-month AQS security scores as the dependent variable.

The overall model was statistically significant and explained more than 39% of the variance,  $R = .62, R^2 = .39$ , adjusted  $R^2 = .37, F(4, 137) = 21.81, p < .001$ . Even taking earlier attachment security into account,  $\beta = .51, t(137) = 7.25, p < .001$ , ma-

TABLE 2  
Descriptive Data for Measures ( $n = 110-155$ )

<i>Measure</i>	<i>Range</i>	<i>M</i>	<i>SD</i>
Bayley MDI, 14 m	51-122	100.10	10.89
Bayley MDI, 24 m	49-134	96.39	14.70
Bayley MDI, 36 m	54-134	97.10	13.13
Attachment security, 14 m	-0.34-0.68	0.28	0.21
Attachment security, 18 m	-0.26-0.73	0.30	0.21

*Note.* MDI = Mental Development Index; m = months.

ternal depression continued to influence attachment security,  $\beta = -.19$ ,  $t(137) = -2.71$ ,  $p < .01$ , and there was a trend for maternal education as well,  $\beta = .14$ ,  $t(137) = 1.98$ ,  $p < .10$ . Over and above these predictors, being in the Early Head Start program made a significantly positive contribution to attachment security at 18 months,  $\beta = .14$ ,  $t(137) = 2.13$ ,  $p < .05$ .

An additional series of multiple regression models was used to test the potential moderating effects of maternal depression and education. The program and risk variables were centered and interaction terms created by multiplying the centered terms. Only education showed a significant interaction with program. The overall model was again significant and explained over 39% of the variance,  $R = .64$ ,  $R^2 = .42$ , adjusted  $R^2 = .39$ ,  $F(4, 136) = 19.31$ ,  $p < .001$ , and program effect remained significant,  $\beta = .17$ ,  $t(136) = 2.55$ ,  $p < .05$ , but the Program  $\times$  Education interaction indicated a moderating effect of education,  $\beta = -.17$ ,  $t(136) = 2.47$ ,  $p < .05$ . Follow-up analyses of high- and low-education groups (split at the median, between 11th and 12th grades) showed that the program effect was statistically significant only in the group of mothers with less than a high school education,  $\beta = .39$ ,  $t(32) = 2.56$ ,  $p < .05$ , showing that maternal education moderated program impacts on attachment security. Another way of interpreting the Program  $\times$  Education interaction is by looking at the impact of education within the program and comparison groups. These analyses showed that education predicted attachment security only in the comparison group,  $\beta = .27$ ,  $t(69) = 2.81$ ,  $p < .01$ , and not in the program group, suggesting that the program may have buffered the effects of low maternal education.

### Cognitive Development

Cognitive test scores from the Bayley MDI, shown in Table 2, varied widely in this sample. Hierarchical multiple regression was used to test whether cognitive development was progressing better for Early Head Start than comparison group children. To predict 24-month and 36-month MDI standard scores, we developed predictor models with maternal education and 14-month MDI standard scores in the first block and program group in the second block. With the 24-month dependent variable, the overall model was statistically significant and explained 25% of the variance,  $R = .50$ ,  $R^2 = .25$ , adjusted  $R^2 = .23$ ,  $F(3, 112) = 12.26$ ,  $p < .001$ . Although the 14-month MDI standard scores made a significant contribution to the regression model,  $\beta = .46$ ,  $t(112) = 5.57$ ,  $p < .01$ , neither maternal education nor being in the Early Head Start program significantly influenced 24-month MDI standard scores after taking the 14-month scores into account. However, with the 36-month dependent variable, the overall model was statistically significant and explained 30% of the variance,  $R = .54$ ,  $R^2 = .29$ , adjusted  $R^2 = .27$ ,  $F(3, 90) = 12.45$ ,  $p < .001$ , with both early predictors making significant contributions to the regression model. These results indicated that maternal education continued to influence cog-

nitive development,  $\beta = .19$ ,  $t(90) = 2.13$ ,  $p < .05$ , even when we took into account 14-month MDI standard scores,  $\beta = .48$ ,  $t(90) = 5.38$ ,  $p < .001$ . Over and above these predictors, being in the Early Head Start program made a significant positive contribution to cognitive development test scores at 36 months,  $\beta = .19$ ,  $t(90) = 2.07$ ,  $p < .05$ . Tests of the potential moderating effect of maternal education were not statistically significant.

## DISCUSSION

The purpose of this study was to test whether a parenting-focused Early Head Start home-visiting program could keep children on track developmentally, given their earlier development and the risk factors facing their families. The results show that in terms of both attachment security and cognitive development, Early Head Start children were doing better than would be expected and the comparison group children worse than expected based on their earlier assessments and levels of risk. These results indicate a positive impact of the program on developmental outcomes that are vulnerable to the negative effects of poor maternal education and, in the case of attachment security, maternal depression. Furthermore, the results show that the impact of the program on attachment security was greater for mothers with low education. Low levels of education have been related to lower ratings of maternal behavioral competence as indicated by ratings of maternal sensitivity, warmth, affect, and engagement (Teti et al., 1995). These and additional maternal behaviors were directly supported through this Early Head Start program's emphasis on promoting positive parent-child interactions.

On average, the toddlers in this Early Head Start program, in contrast to those in the comparison group, showed more secure base behavior indicating attachment security and maintained more age-appropriate progress in their cognitive skills. In terms of attachment security, Early Head Start toddlers showed an increase in secure base behavior from 14 to 18 months, whereas comparison toddlers did not. The attachment security scores for the Early Head Start children in this sample were low, averaging .31 at 18 months compared with scores closer to .40 reported in some studies of middle-income samples (e.g., Jarvis & Creasey, 1991; Pederson et al., 1990). In their report of attachment security among children in poverty, Diener and colleagues (2003) suggested that a score of .32 is low, but children in the NICHD child care study data set randomly selected from populations at multiple sites in the United States had an average attachment security score of only .29 (Bakermans-Kranenburg et al., 2004). Thus, the children in our study showed attachment security scores comparable to those of both a low-income sample and a large random sample with a wide range of income. By 18 months, an age when secure base behavior has become well organized in relation to other behavioral systems (Ainsworth et al., 1978), Early Head Start toddlers showed more secure base

behavior indicative of a secure attachment to their mothers. Thus, Early Head Start toddlers tended to do better than expected in their first primary relationship, and comparison group children tended to do worse than expected, based on earlier predictors. The important period for the development of attachment occurs early on, so even by 14 months children with lower scores show a divergent trajectory toward less secure attachment. Nevertheless, the significant increase in attachment security scores by 18 months for the Early Head Start group in this study suggests that the Early Head Start intervention helped support improved attachment relationships between mothers and their toddlers. Because attachment security predicts later social behavior, these early gains are an important impact of Bear River Early Head Start.

In terms of cognitive skills, Early Head Start had a positive impact on children's cognitive standard scores by age 3, given children's earlier cognitive standard scores and levels of maternal education. In contrast, the comparison group toddlers, similar to others in poverty (Black et al., 2000), made slower progress, as indicated by their lower cognitive standard scores. The average MDI standard scores in our sample were close to the average of the population at age 14 months (100 is the standard score mean), with somewhat less variability (standard deviation at all ages less than the standard deviation of 15 for standard scores in the norming population). The standard scores stayed close to that level in the Early Head Start group, but a drop of more than a third of a standard deviation in the comparison group showed that that group was developing more slowly. By 36 months, the difference was apparent in a multiple regression model in which the program showed an impact over and above early predictors. These analyses, however, showed no evidence of a program impact at 24 months. Perhaps this was because it took longer for the impacts to become evident in children's cognitive development or because the detrimental effects of poverty on cognitive development that only begin to become apparent in the second year of life (Black et al., 2000) had not yet begun to manifest in the comparison group. Nevertheless, our results show that the cognitive development trajectories for the Early Head Start children and the comparison group children in this low-income sample had clearly diverged by age 3, well before most children begin preschool programs designed to prepare them for school success. The effect of the program on cognitive standard scores represents another important positive impact of Bear River Early Head Start. The strength of the predictions from earlier assessments, even when controlling for risk factors, suggests that these group differences are likely to persist over time. This program's emphasis on positive parenting to facilitate children's development increases the likelihood that these program impacts will continue to support the development of these vulnerable children. A parenting-focused model such as this one is designed to support comfortable interactions and activities that are likely to continue in the context of the parent-child relationship even after the parenting program has ended (Roggman et al., 2008).

Children in the comparison group may have shown poorer developmental trajectories for a variety of reasons. Various pathways have been proposed to account for the influence of poverty on children's development, but most focus on the home environment, parental mental health, patterns of parent-child interaction, and chronic stressors (Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997; McLoyd, 1998), which are often interrelated. Votruba-Drzal (2006) used family stress theory to explain the impact of poverty on child development through the impact of generally poor maternal well-being, which leads to ineffective parenting practices that are "harsh and inconsistent and also less nurturing and responsive to children's needs" (p. 1155). Indeed, mothers living in poverty are more likely than non-poor mothers to use harsh discipline and less likely to talk with or read to their children (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001). Together, these aspects of parenting affected by poverty may fail to support children's early attachment and cognitive development. Through the impact of chronic stress associated with poverty, mothers' mental health (Lyons-Ruth, 1992; Reading & Reynolds, 2001) may reduce their responsiveness and thereby account for the effect of poverty on children's attachment security (Bakermans-Kranenburg et al., 2004). Brooks-Gunn and Markman (2005) reported that aspects of the home learning environment such as less responsive and warm parent-child interactions, the poor or unsafe condition of the home, and few opportunities for learning and exploration may account for almost 50% of the influence of poverty on children's cognitive development. The influence of poverty on parenting is particularly alarming for infants and toddlers because they are more dependent on their parents and have fewer cognitive and social opportunities outside of their home than at any other time of their lives (Votruba-Drzal, 2006).

The parenting-focused program in this study was particularly effective at promoting attachment security in children with poorly educated mothers. Because of their low levels of education, these mothers were likely to have been less able to get parenting information and support elsewhere. Parents with more education, whether in the program or the comparison group, were likely to have been better able to identify and use resources to help them learn more about their children's developmental needs and to develop effective parenting behaviors to meet those needs and thereby support their children's early development. Low education was also a risk factor for cognitive development among the children in this study, so other parenting characteristics related to poor education, such as limited knowledge of early cognitive development or limited support for exploration and communication, may have also contributed to children's poorer cognitive development, particularly in the comparison group. For these reasons, parenting is an important focus of programs that aim to support early development in children from low-income families, especially those at risk because of poor education.

The theory of change held by Bear River Early Head Start emphasized parenting support as the primary approach for promoting children's early develop-

ment. The primary approach of Bear River Early Head Start was to improve the expected developmental outcomes of infants and toddlers by focusing on parenting as a way to promote children's early development. The process by which the program intended to affect parenting was through an emphasis on positive interactions including mother-child responsiveness and social play supplemented with comprehensive services related to family self-sufficiency and parent mental health. The program provided mental health services to address maternal depression within the program, through a trained mental health provider on staff, and through referrals to community agencies that could provide more intensive psychological services. The home-visiting services of the program were designed to provide positive and supportive relationships with parents in the context of comprehensive program services and to explicitly encourage particular aspects of parenting. Perhaps even more important, home visitors individualized their home visits to actively support, engage, and encourage positive parent-child interactions for parents who were stressed, anxious, severely depressed, mildly depressed, illiterate, or experiencing whatever barrier was interfering with their interactions with their children.

Through this mix of services, the program hoped to improve the overall functioning of families in a way that would help mothers interact with their infants and toddlers more often, for more time, and in more positive ways to promote secure attachment and playful exploration. Parenting has been suggested as a key factor explaining the powerful effects of poverty on early development, but the impact of poverty on parenting can be moderated or mediated by a variety of factors, including the risk factors of maternal education and maternal depression identified here, that influence children's development through their effects on parenting (Brooks-Gunn & Duncan, 1997; Bradley et al., 2001; Teti et al., 1995). By working through parents, then, Bear River Early Head Start hoped to ameliorate the impact of poverty by increasing the kind of parenting that supports children's early development and, at the same time, decreasing risk factors by providing supplemental services such as referrals to community education and mental health resources. The results here suggest that the program was at least somewhat successful in doing that because the children in the program were generally doing better than expected in terms of both early attachment and early cognitive development.

The home visitors in Bear River Early Head Start explicitly guided parents to accurately read their infants' cues and recommended various aspects of what they called "attachment parenting," such as close physical contact and sensitive responsiveness to children's physical and emotional needs. These efforts and other program services may have offered the support parents needed to cope with the stress of poverty and to provide the caregiving their children needed to develop attachment security and to confidently explore their environments. Interventions to increase attachment security have often focused on maternal sensitivity, with mixed success (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). Whether a



more focused approach or a more comprehensive approach is better for helping parents support children's attachment security is unclear (cf. Bakermans-Kranenburg et al., 2003; Berlin, 2005; Egeland, Weinfield, Bosquet, & Cheng, 2000). The "Circle of Security" intervention (Marvin, Cooper, Hoffman, & Powell, 2002) has offered a promising and comprehensive way of promoting parenting cognitions and behaviors that support the development of secure attachment. The more general approach of a program like Bear River Early Head Start may offer another means of helping low-income parents respond in positive ways to their children and thereby support the early mother-child relationship. Risk factors such as depression, poverty, or low education by themselves do not equate to inadequate parenting. Specifically, not all depressed mothers experience depression similarly, and not all children of depressed mothers experience negative outcomes (Toth et al., 2009). The general, parenting-focused approach of a program like Bear River Early Head Start may offer an effective means of promoting positive parenting and thereby helping parents support their children's development in multiple domains.

The intervention strategy used by this program with low-income parents was also successful in preventing the slowed cognitive development sometimes seen among children in poverty (Black et al., 2000). The cognitive measure used in this study assesses cognition as broadly defined and, hence, includes aspects of cognition that require language. Hart and Risley (1995) described the impoverished language environments provided to children in families of low socioeconomic status compared with more advantaged families and the related widely divergent language trajectories of these children. The program in this study aimed to provide a cognitively stimulating early environment for children by providing low-income parents with information about early cognitive development, encouraging positive parent-child interactions, and emphasizing play and exploration during home visits. Perhaps this indirect approach of focusing on parenting that then in turn supports infant cognitive development explains why the advantage for the program group was not apparent until age 3. By encouraging stimulating interactions that include play and conversation, Bear River Early Head Start may have helped bridge the gap between the environments of children from low- and middle-SES families.

A body of research evidence is accumulating that suggests particular approaches that are effective in the context of two-generation or family-centered models (St. Pierre, Layzer, & Barnes, 1996) such as the one used by Bear River Early Head Start. For example, several studies have shown the importance of building a supportive relationship with parents (Barnard, Morisset, & Spieker, 1993; Bernstein, Campbell, & Akers, 2001; Emde, Korfmacher, & Kubicek, 2000) and the importance of emphasizing child development and parenting (Administration for Children, Youth, & Families, 2002; Daro & Harding, 1999; Guralnick, 1998; van den Boom, 1994). In addition, the research literature supports the value of engaging parent and child together as part of regular program services

(Mahoney, Boyce, Frewell, Spiker, & Wheeden, 1998; Roggman et al., 2001) and explicitly encouraging positive parenting behaviors such as warmth, responsiveness, autonomy support, and conversation (Hebbeler & Gerlach-Downie, 2002; Mahoney & Perales, 2005; Pfannenstiel & Seltzer, 1989). Together, these strategies can provide an effective means of providing guidance for low-income parents so their children can avoid the negative developmental consequences often associated with living in poverty.

This study has several limitations to address. Because the risk variables and child attachment security were all measured from maternal report, shared method variance or response bias could have affected those variables and increased the relatedness among them. Shared method variance is possible but unlikely because the content of the various measures had little or no overlap (cf. Bretherton, Biringen, & Ridgeway, 1991) and the measures were obtained at different times and in different ways. The maternal education variable was from program application forms, the maternal depression measure was from telephone interviews before random assignment, and the child attachment security measure was from a card sort at child ages 14 and 18 months. The possibility of response bias is more of a concern because mothers with low education or high depression could have been less likely to notice or recognize their children's emerging secure base behavior. The preinterview, however, offered an opportunity to teach mothers about these behaviors and call these behaviors to the mothers' attention during the weeks before the in-home card sort from which the research measure was derived. In addition, these risk variables were included as covariates in the analyses that tested program impact. Moreover, other research has shown associations of maternal education or depression as measured by maternal report with maternal behavior or attachment as measured by independent observers (Bakermans-Kranenburg et al., 2004; Pederson et al., 1990) and associations of attachment as measured by independent observers with aggression as reported by mothers (Shaw & Vondra, 1995).

Another limitation of this study is that the length of program enrollment varied by family because families could enroll in this particular Early Head Start program at any time from early pregnancy up to when the child was 10 months old. Moreover, after enrollment families sometimes moved out of the service area or withdrew from the program before their child was 3 years old. These variations in the duration of program services were not addressed in this study but could have been a factor in the success of the intervention for individual families. Similar to the interaction of intervention group with maternal education, the length of enrollment could have interacted with several other family characteristics such that different families could have benefited from varying durations of enrollment. Nevertheless, the analyses reported here suggest that children whose families were randomly assigned to the program group benefited from that enrollment by showing better early development in important domains.

In summary, the primary implication of this study is that intervening early with a parenting-focused home-visiting program can help parents keep children developmentally on track who are otherwise at risk for getting off track because of poverty. Our results suggest that the two-generation approach offered by Bear River Early Head Start resulted in children in the program showing more positive developmental trajectories than children in the comparison group. The parenting-focused approach of this program thus has the potential to buffer some of the negative effects of poverty by increasing the ability of parents to support their children's early attachment and cognitive development.

## REFERENCES

- Aber, J. L., Jones, S., & Cohen, J. (2000). The impact of poverty on the mental health and development of very young children. In C. Zeanah (Ed.), *Handbook of infant mental health* (2nd ed., pp. 113–128). New York: Guilford Press.
- Administration for Children, Youth, & Families. (2002). *Making a difference in the lives of infants and toddlers and their families: The impacts of Early Head Start*. Washington, DC: U.S. Department of Health and Human Services.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Bradley, R. H. (2005). Those who have, receive: The Matthew effect in early childhood intervention in the home environment. *Review of Educational Research, 75*, 1–26.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin, 129*, 195–215.
- Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Kroonenberg, P. M. (2004). Differences in attachment security between African-American and white children: Ethnicity or socio-economic status? *Infant Behavior & Development, 27*, 417–433.
- Barnard, K. E., Morisset, C. E., & Spieker, S. (1993). Preventive interventions: Enhancing parent–infant relationships. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (pp. 386–399). New York: Guilford Press.
- Belsky, J., & Fearon, R. M. P. (2002). Infant–mother attachment security, contextual risk and early development: A moderational analysis. *Development and Psychopathology, 14*, 293–310.
- Berlin, L. J. (2005). Interventions to enhance early attachments. In L. J. Berlin, Y. Ziv, L. Amaya-Jackson, & M. T. Greenberg (Eds.), *Enhancing early attachments: Theory, research, intervention, and policy* (pp. 3–33). New York: Guilford Press.
- Bernstein, V. J., Campbell, S., & Akers, A. (2001). Caring for the caregivers: Supporting the well-being of at-risk parents and children through supporting the well-being of the programs that serve them. In J. Hughes, J. Close, & A. La Greca (Eds.), *Handbook of psychological services for children and adolescents* (pp. 107–131). New York: Oxford University Press.
- Black, M. M., Hess, C. R., & Berenson-Howard, J. (2000). Toddlers from low-income families have below normal mental, motor, and behavior scores on the revised Bayley scales. *Journal of Applied Developmental Psychology, 21*, 655–666.
- Bost, K. K., Vaughn, B. E., Washington, W. N., Cielinski, K. L., & Bradbard, M. R. (1998). Social competence, social support, and attachment demarcation of construct domains, measurement, and paths of influence for preschool children attending Head Start. *Child Development, 69*, 192–218.

- Bowlby, J. (1982). *Attachment and loss: Vol. I. Attachment*. New York: Basic.
- Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory*. London: Tavistock.
- Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*, 371–399.
- Bradley, R. H., Corwyn, R. F., McAdoo, H. P., & Garcia Coll, C. (2001). The home environments of children in the United States: Part I. Variations by age, ethnicity, and poverty status. *Child Development*, *72*, 1844–1867.
- Brennan, P. A., Hammen, C., Andersen, M. J., Bor, W., Najman, J. M., & Williams, G. M. (2000). Chronicity, severity, and timing of maternal depressive symptoms: Relationships with child outcomes at age 5. *Developmental Psychology*, *36*, 759–766.
- Bretherton, I., Biringen, Z., & Ridgeway, D. (1991). The parental side of attachment. In K. A. Pillemer & K. McCartney (Eds.), *Parent-child relations throughout life* (pp. 1–24). Hillsdale, NJ: Erlbaum.
- Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children*, *7*, 55–71.
- Brooks-Gunn, J., & Markman, L. B. (2005). The contribution of parenting to ethnic and racial gaps in school readiness. *The Future of Children*, *15*, 139–168.
- Burchinal, M. R., Campbell, F. A., Bryant, D. B., Wasik, B. H., & Ramey, C. T. (1997). Early intervention and mediating processes in cognitive performance of children of low-income African-American families. *Child Development*, *68*, 935–954.
- Colman, R., & Thompson, R. A. (2002). Attachment status, adaptive functioning, and problem-solving interaction styles in mother-child dyads. *Merrill-Palmer Quarterly*, *48*, 337–359.
- Culp, A. M., Hubbs-Tait, L., Culp, R. E., & Starost, H. J. (2001). Maternal parenting characteristics and school involvement: Predictors of kindergarten cognitive competence among Head Start children. *Journal of Research in Childhood Education*, *15*, 5–17.
- Cunningham, A. E., & Stanovich, K. E. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology*, *33*, 934–945.
- Daro, D., & Harding, K. A. (1999). Healthy Families America: Using research to enhance practice. *The Future of Children*, *9*, 152–176.
- Diener, M. L., Nievar, M. A., & Wright, C. (2003). Attachment security among mothers and their young children living in poverty: Associations with maternal, child, and contextual characteristics. *Merrill-Palmer Quarterly*, *49*, 154–182.
- Duncan, G. J., & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development*, *71*, 188–196.
- Duncan, G. J., Brooks-Gunn, J., & Klebanov, P. (1994). Economic deprivation and early childhood development. *Child Development*, *65*, 296–318.
- Egeland, B., Weinfield, N. S., Bosquet, M., & Cheng, V. K. (2000). Remembering, repeating, and working through: Lessons from attachment-based interventions. In J. D. Osofsky & H. E. Fitzgerald (Eds.), *WAIMH handbook of infant mental health: Vol. 4. Infant mental health in groups at high risk* (pp. 35–89). New York: Wiley.
- Emde, R. N., Korfmacher, J., & Kubicek, L. F. (2000). Toward a theory of early relationship-based intervention. In J. D. Osofsky & H. E. Fitzgerald (Eds.), *WAIMH handbook of infant mental health: Vol. 2. Early intervention, evaluation, and assessment* (pp. 3–32). New York: Wiley.
- Erickson, M. F., Sroufe, L. A., & Egeland, B. (1985). The relationship between quality of attachment and behavior problems in a high-risk sample. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research* (pp. 147–167), *Monographs of the Society for Research in Child Development*, *50* (1–2).
- Fox, R., Platz, D., & Bentley, K. S. (1995). Maternal factors related to parenting practices, developmental expectations, and perceptions of child behavior problems. *Journal of Genetic Psychology*, *156*, 431–441.

- Frankel, K. A., & Bates, J. E. (1990). Mother-toddler problem solving: Antecedents in attachment, home behavior, and temperament. *Child Development, 61*, 810-819.
- Guralnick, M. J. (1998). Effectiveness of early intervention for vulnerable children: A developmental perspective. *American Journal on Mental Retardation, 102*, 319-345.
- Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experiences of young American children*. Baltimore: Brookes.
- Hebbeler, K., & Gerlach-Downie, S. (2002). Inside the black box of home visiting: A qualitative analysis of why intended outcomes were not achieved. *Early Childhood Research Quarterly, 17*, 28-51.
- Hubbs-Tait, L., Culp, A. M., Culp, R. E., & Miller, C. E. (2002). Relation of maternal cognitive stimulation, emotional support, and intrusive behavior during Head Start to children's kindergarten cognitive abilities. *Child Development, 73*, 110-132.
- Jacobsen, T., Edelstein, W., & Hofmann, V. (1994). A longitudinal study of the relation between representations of attachment in childhood and cognitive functioning in childhood and adolescence. *Developmental Psychology, 30*, 112-124.
- Jarvis, P. A., & Creasey, G. L. (1991). Parental stress, coping, and attachment in families with an 18-month-old infant. *Infant Behaviour and Development, 14*, 383-395.
- Korenman, S., Miller, J. E., & Sjaastad, J. E. (1995). Long-term poverty and child development in the United States: Results from the National Longitudinal Survey of Youth. *Children and Youth Services Review, 17*, 127-151.
- LaFreniere, P. J., & Sroufe, L. A. (1985). Profiles of peer competence in the preschool: Interrelations among measures, influence of social ecology, and relation to attachment history. *Developmental Psychology, 21*, 56-69.
- Lyons-Ruth, K. (1992). Maternal depressive symptoms, disorganized infant-mother attachment relationships, and hostile-aggressive behavior in the preschool classroom: A prospective longitudinal view from infancy to age five. In D. Cicchetti & S. Toth (Eds.), *Developmental perspectives on depression* (pp. 131-171). Rochester, NY: University of Rochester Press.
- Lyons-Ruth, K., Easterbrooks, M. A., & Cibelli, C. D. (1997). Infant attachment strategies, infant mental lag, and maternal depressive symptoms: Predictors of internalizing and externalizing problems at age 7. *Developmental Psychology, 33*, 681-692.
- Mahoney, G., Boyce, G. C., Fewell, R., Spiker, D., & Wheeden, C. A. (1998). The relationship of parent-child interaction to the effectiveness of early intervention services for at-risk children and children with disabilities. *Topics in Early Childhood Special Education, 18*, 5-17.
- Mahoney, G., & Perales, F. (2005). Relationship-focused early intervention with children with pervasive developmental disorders and other disabilities: A comparative study. *Developmental and Behavioral Pediatrics, 26*, 77-85.
- Marvin, R., Cooper, G., Hoffman, K., & Powell, B. (2002). The Circle of Security Project: Attachment-based intervention with caregiver-preschool-child dyads. *Attachment and Human Development, 4*, 107-124.
- McLeod, J. D., & Shanahan, M. J. (1993). Poverty, parenting and children's mental health. *American Sociological Review, 58*, 351-366.
- McLoyd, V. C. (1998). Children in poverty: Development, public policy, and practice. In W. Damon (Series Ed.) and I. Sigel & K. A. Renninger (Vol. Eds.), *Handbook of child psychology: Vol. 4. Child psychology in practice* (5th ed., pp. 135-208). New York: Wiley.
- Meins, E., Fernyhough, C., Russell, J., & Clark-Carter, D. (1998). Security of attachment as a predictor of symbolic and mentalising abilities: A longitudinal study. *Social Development, 7*, 1-24.
- Moss, E., & Gosselin, C. (1997). Attachment and joint problem-solving experiences during the preschool period. *Social Development, 6*, 1-17.
- National Institute of Child Health and Human Development Early Child Care Research Network. (1999). Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Developmental Psychology, 35*, 1297-1310.

- National Institute of Child Health and Human Development Early Child Care Research Network. (2005). Duration and developmental timing of poverty and children's cognitive and social development from birth through third grade. *Child Development, 76*, 795–810.
- Pederson, D. R., & Moran, G. (1995). A categorical description of infant–mother relationships in the home and its relation to Q-sort measures of infant–mother interaction. *Monographs of the Society for Research in Child Development, 60*(2–3), 111–132.
- Pederson, D., Moran, G., Sitko, C., Campbell, K., Ghesquiere, K., & Acton, H. (1990). Maternal sensitivity and the security of infant–mother attachment: A Q-sort study. *Child Development, 61*, 1974–1983.
- Pfannenstiel, J., & Seltzer, D. (1989). New parents as teachers: Evaluation of an early parent education program. *Early Childhood Research Quarterly, 4*, 1–18.
- Psychological Corporation. (1993). *Bayley Scales of Infant Development: Mental Development Index and Behavior Rating Scale*. San Antonio, TX: Harcourt Brace.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.
- Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist, 58*, 109–120.
- Reading, R., & Reynolds, S. (2001). Debt, social disadvantage, and maternal depression. *Social Science & Medicine, 53*, 441–453.
- Reyna, R., Schulz, J., & Laird, E. (2007). Effect of marriage on child cognitive development by maternal education. *Policy Matters, 5*, 25–30.
- Roggman, L. A., Boyce, L., Cook, G., & Jump, V. (2001). Inside home visits: A collaborative look at process and quality. *Early Childhood Research Quarterly, 16*, 53–71.
- Roggman, L. A., Boyce, L. K., & Innocenti, M. S. (2008). *Developmental parenting: A guide for early childhood practitioners*. Baltimore: Brookes.
- Roggman, L. A., Cook, G. A., & Jump, V. K. (2000). *Early Head Start continuous program improvement: Final report*. Logan: Utah State University.
- Rutter, M., & Rutter, M. (1993). *Developing minds: Challenge and continuity across the life span*. New York: Basic Books.
- Schweinhart, L. J., & Weikart, D. P. (1989). The High/Scope Perry preschool study: Implications for early childhood care and education. *Prevention in Human Services, 7*, 109–132.
- Seifer, R., & Schiller, M. (1995). The role of parenting sensitivity, infant temperament, and dyadic interaction in attachment theory and assessment. *Monographs of the Society for Research in Child Development, 60*(2–3), 146–174.
- Shaw, D. S., & Vondra, J. L. (1995). Infant attachment security and maternal predictors of early behavior problems: A longitudinal study of low-income families. *Journal of Abnormal Child Psychology, 23*, 335–357.
- St. Pierre, R. G., Layzer, J. I., & Barnes, H. V. (1996). Two-generation programs: Design, cost, and short-term effectiveness. *The Future of Children, 5*, 76–93.
- Teti, D., Gelfand, D., Messinger, D., & Isabella, R. (1995). Maternal depression and the quality of early attachment: An examination of infants, preschoolers, and their mothers. *Developmental Psychology, 31*, 364–376.
- Teti, D. M., & McGourty, S. (1996). Using mothers versus trained observers in assessing children's secure base behavior: Theoretical and methodological considerations. *Child Development, 67*, 597–605.
- Toth, S., Rogosch, F., Sturge-Apple, M., & Cicchetti, D. (2009). Maternal depression, children's attachment security, and representational development: An organizational perspective. *Child Development, 80*, 192–208.
- Turner, P. J. (1991). Relations between attachment, gender, and behavior with peers in preschool. *Child Development, 62*, 1475–1488.
- van Dam, M., & van IJzendoorn, M. (1988). Measuring attachment security: Concurrent and predictive validity of the parental Attachment Q-Set. *Journal of Genetic Psychology, 149*, 447–457.

- van den Boom, D. (1994). The influence of temperament and mothering on attachment and exploration: An experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Development, 65*, 1457–1477.
- van IJzendoorn, M. H., Dijkstra, J., & Bus, A. G. (1995). Attachment, intelligence, and language: A meta-analysis. *Social Development, 4*, 115–128.
- Vaughn, B., Egeland, B., Waters, E., & Sroufe, L. A. (1979). Individual differences in infant–mother attachment at 12 and 18 months: Stability and change in families under stress. *Child Development, 50*, 971–975.
- Votruba-Drzal, E. (2006). Economic disparities in middle childhood development: Does income matter? *Developmental Psychology, 42*, 1154–1167.
- Waters, E. (n.d.). *Assessing secure base behavior and attachment security using the Q-sort method*. Retrieved January 13, 2008 from [www.psychology.sunysb.edu/attachment/measures/content/aqs\\_method.html](http://www.psychology.sunysb.edu/attachment/measures/content/aqs_method.html)
- Waters, E. (1987a). *Attachment Q-Set*. Unpublished instrument, Stony Brook, NY.
- Waters, E. (1987b, April). *Validation of strange situation classifications via Q-sort data on secure base behavior at home*. Symposium presented at the meeting of the Society for Research in Child Development, Baltimore, MD.
- Waters, E., & Deane, K. (1985). Defining and assessing individual differences in attachment childhood relationships: Q-methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research* (pp. 41–55), *Monographs of the Society for Research in Child Development, 50*(1–2).
- Weinfield, N. S., Sroufe, L. A., Egeland, B., & Carlson, E. (1999). The nature of individual differences in infant-caregiver attachment. In J. Cassidy & P. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical application* (pp. 68–88). New York: Guilford Press.
- Zeanah, C. H., Boris, N. W., & Larrieu, J. A. (1997). Infant development and developmental risk: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 36*, 165–178.