Matern Child Health J
DOI 10.1007/s10995-008-0329-1

Food Security During Infancy: Implications for Attachment and Mental Proficiency in Toddlerhood

Martha Zaslow · Jacinta Bronte-Tinkew · Randolph Capps · Allison Horowitz · Kristin A. Moore · Debra Weinstein

Abstract *Objective* This study examined the associations between household food security (access to sufficient, safe, and nutritious food) during infancy and attachment and mental proficiency in toddlerhood. *Methods* Data from a longitudinal nationally representative sample of infants and toddlers ($n = 8944$) from the Early Childhood Longitudinal Study—9-month (2001–2002) and 24-month (2003–2004) surveys were used. Structural equation modeling was used to examine the direct and indirect associations between food insecurity at 9 months, and attachment and mental proficiency at 24 months. *Results* Food insecurity worked indirectly through depression and parenting practices to influence security of attachment and mental proficiency in toddlerhood. *Conclusions* Social policies that address the adequacy and predictability of food supplies in families with infants have the potential to affect parental depression and parenting behavior, and thereby attachment and cognitive development at very early ages.

Keywords Mental proficiency · Food security · Parental depression · Attachment · Toddlers

M. Zaslow (✉) · J. Bronte-Tinkew · A. Horowitz · K. A. Moore · D. Weinstein
Child Trends, 4301 Connecticut Avenue NW, Washington, DC 20008, USA
e-mail: mzaslow@childtrends.org

R. Capps
The Urban Institute, 2101 M Street NW, Washington, DC 20037, USA

Introduction

Food security concerns access to sufficient, safe and nourishing food in socially acceptable ways. Low food security, or food insecurity, is defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire food in socially acceptable ways" [1]. A growing body of research indicates that food insecurity may be associated with a heightened incidence of behavior problems and hinder cognitive development and achievement in preschool-age and school-age children [2]. Food insecurity appears to be related to children's developmental outcomes even when socioeconomic factors, such as family income and poverty, are taken into account [3], and even within samples that are restricted to very low income families [4]. Thus, measures of food insecurity appear to go beyond broad markers of socioeconomic status to more fully and directly capture concerns about the adequacy and consistent availability of resources, and to have consequences for children's well-being.

Regrettably, most research to date on food security and children's development has not focused on developmental outcomes in the first years of life. Moreover, existing studies of food security and children's development have generally relied on cross-sectional data, which provide limited opportunity to examine the pathways by which food security may come to influence children's development over time. Using data from a longitudinal nationally representative sample of infants and toddlers, the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), we address this gap in existing research by asking: (1) *whether* household food security in infancy is related to children's social and emotional development (security of attachment) and cognitive development (Bayley Mental Development

Scale) during toddlerhood; and (2) *how* food security comes to influence children's early social and emotional and cognitive development.

Literature Review

Food Security and Child Outcomes

An accumulating body of evidence indicates that family food insecurity may be associated with preschool-age and school-age children's social and emotional as well as cognitive development. While some recent studies isolate for focus "food insufficiency," the most severe level of food insecurity, involving lack of food, others focus more broadly on food insecurity (which also includes concerns about the adequacy of food and its sources whether or not there is an insufficient supply).

Social and Emotional Development

Research focusing on food insufficiency has found it to be associated with higher scores on a pediatric checklist for symptoms of psychosocial dysfunction, with having seen a mental health professional for an emotional, mental or behavioral problem [3, 5], and among older school-age children, with having been suspended from school and having difficulty getting along with other children [3]. The occurrence, intensity and persistence of food insecurity have been found to predict a higher incidence of behavior problems overall [6], as well as internalizing (sad, withdrawn) and externalizing (aggressive, acting out) behavior problems more specifically [7]. Studies focusing only on very low-income families (such as families receiving Temporary Assistance for Needy Families) have found a pattern of elevated behavior problems among children of mothers reporting difficulty obtaining food, even when further measures of economic resources are taken into account [4].

Cognitive Development

Studies also suggest less positive cognitive development among children in households experiencing food insufficiency or food insecurity, though the evidence is somewhat less consistent than findings for social and emotional development [3, 5, 7]. Among low-income families, hunger within the household has been found to predict children's receipt of special education services [5]. Research links food insecurity with lower scores on math achievement and with increased likelihood of grade repetition [3]. The duration of food insecurity has also been found to predict scores on subtests of the Woodcock Johnson-Revised assessment measuring cognitive achievement [7].

The body of research examining the direct associations between family food security and children's social and emotional and cognitive development has focused on children of preschool age and older. In seeking to extend the research to the earliest years of life, we use the research on older children to articulate the following hypothesis:

H_1 Food insecurity during infancy will be *directly* associated with less positive social and emotional and cognitive outcomes for children during toddlerhood.

Indirect Associations between Food Security and Child Outcomes

Much of the research on food security looks at direct associations with child outcomes, considering only whether food insecurity predicts less favorable child outcomes. However, the possibility exists that the links between food security and children's development may be mediated by further variables. In particular, research raises the possibility that maternal depression, parent–child interactions, and cognitively stimulating activities may help to explain the associations between food security and children's social and emotional and cognitive outcomes.

There is strong evidence that mothers in food insufficient or food insecure households have elevated depressive symptoms. For example, a comprehensive examination of the relationships between food insufficiency and adult depression in a Canadian national sample found a significant relationship between level of food insufficiency and symptoms of depression, with a stronger relationship for women than for men [8]. A similar pattern has been found in a US sample in a study of food insecurity [6].

Maternal depression, in turn, has been found to be associated with multiple aspects of mother–child interaction, with evidence pointing to particularly consistent associations during the infancy period. A meta-analysis of studies of depression and observed mother–child interaction [9] considered three types of parenting behavior: negative (hostile, coercive), disengaged (nonresponsive), and positive (engaging in play, praising, expressing affection). The meta-analysis indicated that children of depressed mothers in three age ranges (infants, preschoolers, and older) all experienced more hostile and coercive behavior when their mothers were depressed, while infants and preschool-aged children also experienced more disengaged behavior. It was only the infants, however, who experienced significant reductions in positive interactions with their mothers, and thus more problematic interaction patterns in all three aspects considered.

Some research suggests that depressed mothers may also provide fewer play materials for their children in the home, engage less in cognitively stimulating activities with their

children, and provide less structure during learning activities [10, 11]. Evidence suggests that the differences in the quality of mother–child interaction, combined with fewer cognitively stimulating materials and activities, may contribute to diminished cognitive development in children of depressed mothers [12–16]. Research also suggests that maternal depression influences social and emotional outcomes [12]. For example, in a study following children from infancy through the preschool period, 3½ year old children of chronically depressed mothers were found to have higher externalizing behavior problem scores than children of nondepressed mothers, while children of both chronically depressed mothers and children of those whose depression had remitted since infancy had higher internalizing behavior problem scores [17].

A particularly important social and emotional outcome during early development is security of attachment [18, 19]. Secure attachment in the first years of life appears to reflect a history of sensitive and responsive interactions with the mother, with more supportive patterns of interaction conveying to the infant that he or she can count on access to the mother when needed for comfort or to help the child feel confident enough to explore the environment [20]. Studies of nonhuman primates raise the possibility that the sense of ready access to and the responsiveness of the mother that contribute to secure attachment can be disrupted when mothers are distracted and tense because it is not possible to predict and rely on the availability of food [18].

Thus, in addition to research examining the direct linkages between food insecurity and child outcomes, we have research documenting the relationship between food insecurity and maternal depression [8], research examining the linkages between maternal depression and mother–child interactions [9], and a body of work examining the relationships between mother–child interaction and measures of children's development [21, 22]. However, we lack research in which a model including all of these components is examined. An important recent development is research examining whether the link between food insecurity and child outcomes is explained by consideration of mediating variables. Thus, maternal depression, stress, expression of warmth to the child, and overall mental health have been found to fully or partially mediate the relationship between food insecurity and child behavior problems [4, 6]. However, the analyses conducted to date do not consider a model allowing for multiple steps, nor simultaneous consideration of direct and indirect effects. Given this gap in the existing research, in the present study we also test the following hypothesis:

H_2 There will be *indirect* effects of food insecurity during infancy on social and emotional and cognitive outcomes during toddlerhood. Specifically, these associations will operate in part through depression, parenting behaviors and cognitively stimulating activities. We hypothesize that food insecurity may increase maternal psychological distress (depression), and maternal psychological distress in turn will influence parenting behaviors and cognitively stimulating activities in the home, which will subsequently influence child outcomes.

Additional Socio-Demographic Factors

A number of additional factors may be associated with food security and/or with children's outcomes, and so we account for these potentially confounding influences in the analyses. These factors include: (a) mother/father's individual characteristics; (b) household level characteristics; (c) child characteristics; and (d) child care characteristics.

Mother/Father's Individual Characteristics We include a measure of maternal age as research suggests that the age of the head of household is positively associated with food security for households with children [23, 24]. Some studies have found that maternal age is associated with sensitivity and responsiveness in interactions with infants [25, 26], attachment outcomes [27–29] and cognitive achievement for children [6, 30]. We account for parental education since higher levels of education are positively associated with food security [23, 24], sensitivity with infants [29], security of attachment [31], and children's early language development [30]. We also include a measure of maternal employment as some (though not all) studies have found associations between maternal employment and security of attachment [32, 33], cognitive development [34], and verbal ability for children [34, 35]. We include a measure of mother's parity because the presence of other children in the household may contribute to infants' positive social and emotional development [36]. However, according to the "resource dilution" hypothesis, large family size allows fewer resources to accrue to any given child, which may in turn be associated with poorer outcomes for children [37, 38].

Household Characteristics We account for family structure because research has found that single-parent households have lower levels of food security than two-parent families [23], and that family structure is associated with children's less positive development on a range of outcomes [39–42]. We also include a measure of poverty status because rates of food security are lower among low-income households than among high-income households [23, 24, 43]. In addition, poverty status has been found to be associated with poorer cognitive as well as social and emotional development for young children [39, 44, 45]. We account for the receipt of WIC and food stamps because families eligible for food stamps and for WIC generally

have low levels of food security [23, 46]. Some research has found that WIC receipt is associated with children's cognitive development, memory, and vocabulary [47–49]. We include a measure of smoking in the household, as research has found an association between maternal smoking and child cognitive development [50, 51]. We account for child's health insurance coverage because lack of health insurance is associated with children's cognitive and social development [52].

We account for the number of well-child visits received because well-child visits represent the primary opportunity for assessing children's development and providing interventions or service referrals for at-risk children [53]. Primary care visits help to promote positive parent–child interactions, increase parents' understanding of child temperament and development, and increase the frequency with which parents read to children [53–55], all of which have implications for children's outcomes. In addition, children with depressed mothers may be less likely to receive these benefits [56]. We also include a measure of parental English fluency as research suggests that households with immigrant parents have lower rates of food security [23], and English fluency has been found to be associated with increased warmth in parenting [57] and authoritative parenting [58], both of which are associated with positive developmental outcomes for children [59].

Child Characteristics We account for the age of the child because some research suggests that food security is lower in households with young children than in households with older children [23, 60]. Inclusion of child age also helps to control for some variation in the age of administration of the direct assessments. We also include a measure of child's race because previous studies have found that rates of food security differ by race/ethnicity [23, 60]. We include child gender because research suggests an association between child gender and secure mother–child attachment as well as cognitive development [28, 61, 62].

Child Care Characteristics We include type of child care arrangement because exposure to center-based child care is associated with cognitive development among infants and toddlers [63, 64].

The Present Study

As summarized above, we have research documenting a relationship between food security and maternal depression [8]. We also have extensive research examining the linkages between maternal depression and mother–child interactions [9], and there is a substantial body of work examining the relationships between mother–child interaction and measures of children's development [21, 22]. We also have studies exploring the relationship between food security and child outcomes. However we lack research in which a fully articulated model is examined asking whether there are direct as well as indirect pathways between food security and child outcomes, empirically testing the linkages across all of the components simultaneously while controlling for a range of potentially confounding variables. This is the purpose of the current analyses.

Data and methods

Data

The analyses use the 9- and 24-month restricted use data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). The ECLS-B is the first longitudinal study in the United States to track a nationally representative sample of children from infancy to the time they enter school. It includes over-samples of important populations such as Asians and American Indians, low- to moderately low-birth weight infants, and twins [65]. Data collection is occurring in five waves: at approximately 9 months after birth, 24 months, 48 months, entrance to kindergarten, and first grade. The primary modes of data collection are in-person interviews, direct child assessments, and videotaping of mother–child interactions, all occurring during home visits. Information on children was also drawn from birth certificates [65, 66]. We focus here on data from the first two data waves: 9 (collected Fall 2001–Fall 2002) and 24 months (collected January 2003–April 2004) [66].

Sample for Proposed Analyses

At 9 months, 10,688 parent interviews and 10,221 child assessments were completed, and at 24 months, 9,835 parent interviews and 9,218 child assessments were completed [66]. Data from the 9-month wave (including retrospective data from the previous calendar year) were used to categorize children in households according to their levels of food security. The 9-month study was also the source for measures used to examine the pathways through which food insecurity influences social and emotional and cognitive development. Longitudinal analyses help to increase confidence that the relationships examined are causal in nature. Therefore, the child outcomes that are examined are derived from the 24-month data collection wave.

Of the original 10,688 cases with complete data at baseline, 1,744 cases were excluded from the analysis because of missing data on the 24-month child-level weight variable, which required that each observation have valid

parent data and child assessment data available from both the 9-month and 24-month interviews for the analyses. Child assessment data were considered valid if children received physical assessments, the Bayley Short Form-Research Edition (BSF-R) mental subscale assessment, and/or the BSF-R motor subscale assessment at both time points (9 and 24 months). Cases with missing data on the child-level weight variable included approximately 850 cases for which no 24-month survey was completed (i.e., cases lost to attrition) as well as cases for which children did not have at least one assessment at each time point (e.g., survey was completed by telephone or parent would not allow assessments to be conducted). Using the Full Information Maximum Likelihood (FIML) method available in Mplus software, which allows Mplus to estimate parameters even for cases with missing data [67, 68], we were able to preserve the size of the remaining sample ($n = 8{,}944$) for the mental proficiency analyses. For the analyses of insecure attachment, an additional 1,050 cases had missing data, mostly on the dependent variable, and so these cases were excluded ($n = 7{,}894$).

Complex Survey Design

All analyses were conducted using sample weights to account for the effects of the stratified clustered sample design of the ECLS-B.

Measures

Outcome Variables

Social and Emotional Well-being Social and emotional development was measured at 24 months using the Toddler Attachment Sort (TAS)-45, which is a shortened version of the Attachment Q Sort [69] and is designed to measure the quality of children's attachment. This assessment is completed by the interviewer on the basis of the interviewer's observations of the child's behavior during a home visit. Through the TAS-45, toddlers were classified into one of four attachment styles: disorganized, avoidant, ambivalent, or securely attached. This classification was then used to create a dichotomous variable to indicate social and emotional well-being, with securely attached coded as [0] and all other attachment styles (i.e., disorganized, avoidant, or ambivalent type) coded as [1]. Interrater reliability for the TAS-45 varied by specific attachment type, but on average interviewers had 82% agreement on attachment categorizations. This exceeds the 80 percent agreement threshold established by the developer of the TAS-45 [70].

Cognitive/Mental Proficiency To measure cognitive development and mental proficiency at 24 months, the Bayley Short Form-Research Edition (BSF-R) Mental Scale was used [65]. It was designed to retain the psychometric properties of the full Bayley Scales of Infant Development-Second Edition (BSID-II), a recognized direct assessment measure for children from infancy to preschool age [71]. The BSID-II has been found to have high internal consistency ($\alpha = 0.88$) and test-retest reliability ($\alpha = 0.83$) [71, 72]. The BSF-R Mental Scale includes items designed to assess early cognitive and language ability as manifested in memory, expressive and receptive vocabulary, reasoning and problem solving, and concept attainment. The BSF-R was administered during the 24 month home visit. Children were presented with tasks that involved naming pictures, verbal comprehension, discriminating objects and pictures, comparing sizes, and matching colors [65]. In order to ensure that the BSF-R created for the ECLS-B accurately measured child performance and retained the psychometric properties of the original BSID-II, a minimum reliability threshold of 0.80 was established, and this threshold was exceeded for the core set of items [70]. Furthermore, interviewer accuracy for the BSF-R was high, with trainees scoring an average of 93% for accuracy of administration and an average of 97% for accuracy of scoring on the BSF-R mental scale. These figures exceeded the recommended thresholds of 85% and 90%, respectively [70].

Primary Predictor

Household Food Security Food security was measured at 9 months using the USDA Household Food Security Survey Module [1]. Using the standard guidelines for use [1], a three-level categorical variable was created based on parent responses to 18 questions regarding a variety of hunger and food security issues (e.g., experiencing hunger, skipping meals, and running out of food) over the past 12 months. This variable was coded to identify the child's household as having (1) high or marginal food security (households that affirm $\leq$2 responses), (2) low food security (those affirming 3 or $\leq$7 responses), or (3) very low food security (households that affirm $\geq$8 responses).

Mediators

Cognitively Stimulating Activities This variable was measured at 9 months using parent responses to three questions concerning the frequency of specific parent-child activities with the child. Parents were asked how often in a typical week they read, sang songs or told stories to their babies. Responses of not at all or once or twice a week were coded as [0] to indicate low frequency, and responses of three to six times a week or every day were coded as [1]

to indicate higher frequency. A single latent variable, composed of these three items, was created in Mplus.

Maternal Depression Maternal depression was measured at 9 months using the 12-item abbreviated version of the Center for Epidemiological Studies of Depression Scale (CES-D) [73]. The CES-D was designed to measure the frequency of depressive symptoms that have been identified in the clinical literature on depression, as well as in other existing depression inventories, and is well known for its psychometric properties [73]. Total scores ranged from 0 to 36 ($\alpha = 0.88$). A cut point on this scale of 5 or higher was used to identify mothers who experienced mild depression and more severe forms of depression and were coded as [1], and mothers experiencing no depression were coded as [0], non-depressed [65].

Parenting Practices Parenting practices were measured at 9 months using the Nursing Child Assessment Teaching Scale (NCATS) [74]. This tool is a measure of parent–child interaction and is based on observation of interactions in the home that were videotaped during the 9-month data collection following the NCATS protocol. The NCATS has been shown to have good reliability and validity [75]. Total scores on this scale ranged from 0 to 43 ($\alpha = 0.72$) [66]. Higher scores indicate more positive parenting practices.

Control Variables

A range of control variables from the 9-month survey were included in the analyses in order to properly specify relationships between food insecurity and child well-being. Each of the outcomes of interest is likely to be correlated with unmeasured factors, and unobserved heterogeneity is a persistent concern. We included covariates that are predictive of food insecurity and/or child outcomes that could (at least in part) be driving any associations found between these variables. At 9 months the control variables fell into four major groups: (a) mother/father's individual characteristics; (b) household level characteristics; (c) child characteristics; and (d) child care characteristics.

Mother/Father's Individual Characteristics Parental education was measured at 9 months using a categorical variable that indicated the highest level of education attained by either residential parent. Parent education was coded as: less than high school, high school degree/equivalent, vocational school/some college, and bachelor's degree or higher, with bachelor's degree or higher serving as the reference category. When educational attainment of two residential parents differed, parental education was coded as the higher of the two. *English fluency* was measured using a categorical variable indicating the mother's fluency in English. Fluency was measured based on the mother's response to a series of questions assessing what language was spoken in the household and how well the mother: (a) spoke English, (b) read English, (c) wrote English, and (d) understood English. If English was spoken in the household, mothers were coded as fluent in English. Mothers who spoke a language other than English indicated whether they spoke, read, wrote, and understood English very well, pretty well, not very well, or not well at all. Mothers who answered that they could do at least three of these "very well" or "pretty well" or that English was the primary language used in their household were coded as [1] (fluent), and others were coded as [0] (not fluent).

Maternal employment at 9 months was measured using a categorical variable indicating the biological mother's employment and identified whether the mother had full-time employment, part-time employment, was looking for work, or was not in the labor force. Mothers who were not in the labor force served as the reference category for the models. *Mother's age at birth* was measured as a continuous variable. *Mother's number of children (parity)* was measured as a continuous variable at the time of the 9-month survey.

Household Level Characteristics At 9 months, *family structure* was measured using a categorical variable that identified the parent figure(s) in the household in order to categorize households as two-parent households, stepparent households, single parent households, or extended households. *Household income* was measured using the poverty index ratio using the following categories: <1.00; 1.00–1.85; 1.86–2.99; and ≥3.00. The *receipt of food stamps* was also measured at 9 months. Those who reported that anyone in the household had received food stamps since the child's birth were coded as [1], and all others were coded as [0]. At 9 months, *WIC receipt* was measured by a dichotomous variable coded as follows: receipt of WIC benefits by either the mother or child in the past 12 months was coded as [1], and non-receipt of WIC benefits was coded as [0]. At 9 months, the *child's exposure to cigarette smoke* was measured using a dichotomous variable. Responses were categorized according to mother's report of whether any members of the household smoked inside the house. Households in which smoking occurred were coded as [1], and other households were coded as [0]. At 9 months, a dichotomous variable was created to measure *receipt of the 'appropriate' number of well-baby visits*. The 'appropriate' number of visits was determined according to the number recommended by the American Academy of Pediatrics [76] and varied by the age of the child at the time of the interview. Based on the recommendations of the American Academy of Pediatrics, the

'appropriate' number of well-baby visits was defined as: five or more visits for children between the ages of 6 and 9 months; six or more visits for children between the ages of 9 and 12 months; seven or more visits for children between the ages of 12 and 15 months; eight or more visits for children between the ages of 15 months and 18 months; and nine or more visits for children aged 18 months or older. Those receiving the age-appropriate number of well baby visits were coded as [1] and those who did not were assigned a value of [0]. *Health insurance coverage* for the focal child was measured using a dichotomous variable at the time of the 9-month survey.

Child Characteristics At 9 months, *child gender* was measured using a dichotomous variable that coded male as [0] and female as [1]. *Child's race* was measured using a categorical variable that identified whether the child was: non-Hispanic White, non-Hispanic Black, Hispanic, or of another race/ethnicity. *Child's age* was measured in months, at the time of the 24-month survey, in order to account for variation in when the survey was actually administered and when developmental assessments were completed (e.g., the BSF-R). The age range for administration of the 9-month wave was 6–22 months; the age range for the 24-month wave was 16–38 months.

Child Care Characteristics A categorical variable that captured the *type of child care arrangement* was included at 9 months and identified the child's use of relative care, non-relative care, center-based care, another type of child care arrangement, or no nonparental child care.

Analytic Strategy

We used structural equation modeling (SEM) for multivariate analyses. Structural equation modeling allowed us to test direct and indirect effects of food insecurity on toddlers' social and emotional development (i.e., attachment) and mental proficiency (i.e., BSF-R) [77]. Analyses were conducted using Mplus, which allows for the use of sampling weights, adjusts for complex sampling designs, and includes procedures to handle missing data. In addition, the Mplus program incorporates methods to investigate highly skewed dichotomous outcomes, as well as multiple manifest indicators (e.g., nominal, ordinal, and continuous) [78]. We assessed the acceptability of model fit using a cut-off of less than 0.06 for the Mean Square Error of Approximation (RMSEA), of greater than 0.95 for the Comparative Fit Index (CFI), of less than 0.90 for the Weighted Root Mean Square Residual (WRMR), and of less than 0.09 for the Standardized Root Mean Square Residual (SRMR).

Results

Descriptive Statistics

Table 1 presents weighted descriptive statistics for all variables in the analysis. At 24 months, 38.7% of the children in the sample were rated as insecurely attached (i.e., having a disorganized, avoidant, or ambivalent attachment pattern) using the Toddler Attachment Sort (TAS-45). On average, children had a mean score on the Bayley Mental Development Index (Bayley Short Form-Research edition; BSF-R) of 34.7, with a range from 0 to 81.8. Nearly nine in ten households with young children reported high or marginal food security (87.5%). On average, more than half of mothers reported reading to their child three or more times per week (54.1%), and nearly nine in ten reported singing to their child three or more times per week (88.3%). Slightly less than half of mothers (45.0%) reported telling stories to their child three or more times per week. Mothers reported a mean of 5.1 on the Center for Epidemiological Studies – Depression (CES-D) scale, with a range from 0 to 36, and had a mean of 27.2 on the Nursing Child Assessment Teaching Scale (NCATS), with a range from 0 to 47. Children in the sample were more likely to be male than female (51.2%, compared to 48.9%) and were, on average, 24.4 months old at the time of the 24-month survey (with an age range from 20 to 38 months). Mothers of infants in the 9-month survey were, on average, 27.3 years old at the time of the child's birth. More than three-quarters of the children (79.7%) lived in a household where no one had received food stamps since the child's birth. The majority of respondents (52.3%) reported that they had received WIC in the past year.

Multivariate Analyses

Social and Emotional Development

Table 2 displays the standardized direct path coefficients for the model estimating the influence of food insecurity on social and emotional development, as well as the direct and indirect associations. Figure 1 displays the direct and indirect paths between food insecurity and social and emotional development measured as insecure attachment (i.e., disorganized, avoidant, or ambivalent attachment) using the Toddler Attachment Sort at 24 months. Including controls, this model has a reasonable fit (RMSEA = 0.010, CFI = 0.929, WRMR = 0.586).

Net of controls, food insecurity has no significant direct association with being insecurely attached. Instead, food insecurity works indirectly through depression and parenting practices to influence insecure attachment. Food

Table 1 Descriptive statistics for variables used in the analysis of the effects of household food insecurity at 9 months on toddlers' social and emotional and cognitive outcomes at 24 months (weighted)

Variables	*M* (%)	*SD*	Description
Primary predictor			
Household food security			
Very low food security	2.6%		Households that affirm ≥ 8 responses on the USDA Food Security Survey Module
Low food security	9.9%		Households affirming ≥3 or ≤7 responses on the USDA Food Security Survey Module
High/marginal food security	87.5%		Households that affirm ≤2 responses on the USDA Food Security Survey Module
Pathway variables (Mediators)			
Cognitively stimulating activities			
Reads to child	54.1%		Whether parent reads to child three or more times per week (1 = yes)
Sings songs to child	88.3%		Whether parent sings songs to child three or more times per week (1 = yes)
Tells stories to child	45.0%		Whether parents tells stories to child three or more times per week (1 = yes)
Maternal depression			
Center for Epidemiological Studies of Depression (CES-D) scale	5.1	11.7	12 item abbreviated scale. Scores range from 0–36.
Parenting Processes			
Parent/Child Interactions—Nursing Child Assessment Teaching Scale (NCATS)	27.2	12.3	73 item scale. Scores range from 0–47
Mother/father individual characteristics			
Parental education			
Less than high school	19.0%		Whether parent's highest education level is less than high school (1 = yes)
High school diploma/equivalent	20.4%		Whether parent's highest education level is high school (2 = yes)
Some college/vocational school	28.9%		Whether parent's highest education level is some college/vocational school (3 = yes)
Bachelor's degree or higher	31.7%		Whether parent's highest education level is Bachelor's degree or more (4 = yes)
English fluency			
Fluent	90.1%		Whether parent is fluent in English (1 = yes)
Not fluent	9.9%		Whether parent is fluent in English (0 = no)
Maternal employment			
Full time	32.3%		Whether mother works full time (1 = yes)
Part time	19.6%		Whether mother works part time (2 = yes)
Looking for work	7.9%		Whether mother is looking for work (3 = yes)
Not in labor force	40.2%		Whether mother is not in labor force (4 = yes)
Mother's age at birth	27.3	13.1	Scores range from 15 to 50.
Mother's number of children	2.0	2.5	Scores range from 1 to 12.
Household characteristics			
Family structure			
Two parents	79.2%		Whether child lives with both biological parents (1 = yes)
Stepparent	1.1%		Whether child lives with stepparent(s) (2 = yes)
Single parent	19.3%		Whether child lives with a single biological parent (3 = yes)

Table 1 continued

Variables	*M* (%)	*SD*	Description
Other	0.4%		Whether child lives in another family structure (4 = yes)
Receipt of food stamps			
Yes	20.3%		Whether anyone in household has received food stamps since child's birth (1 = yes)
No	79.7%		Whether anyone in household has received food stamps since child's birth (0 = no)
Receipt of WIC			
Yes	52.3%		Whether respondent or child received WIC in past 12 months (1 = yes)
No	47.7%		Whether respondent or child received WIC in past 12 months (0 = no)
Health insurance coverage			
Yes	95.8%		Whether child has health care coverage (1 = yes)
No	4.3%		Whether child has health care coverage (0 = no)
Child's exposure to cigarette smoke			
Yes	11.4%		Whether child lives in a smoking household (1 = yes)
No	88.6%		Whether child lives in a smoking household (0 = no)
Receipt of 'appropriate' number of well-baby visits			
Yes	19.2%		Whether child received appropriate number of well-baby visits for his/her age (1 = yes)
No	80.8%		Whether child received appropriate number of well-baby visits for his/her age (0 = no)
Poverty ratio			
<1:00	25.8%		Whether the ratio of household income to the Federal Poverty Line is less than 1.00 (1 = yes)
1:00–1:85	24.5%		Whether the ratio of household income to the Federal Poverty Line is between 1.00 and 1.85 (2 = yes)
1.86–2.99	18.4%		Whether the ratio of household income to the Federal Poverty Line is between 1.85 and 2.99 (3 = yes)
>3:00	31.3%		Whether the ratio of household income to the Federal Poverty Line is above 2.99 (4 = yes)
Child characteristics			
Child gender			
Male	51.2%		Whether child is male (0 = yes)
Female	48.9%		Whether child is female (1 = yes)
Child race			
Non-Hispanic White	43.1%		Whether child is non-Hispanic white (1 = yes)
Non-Hispanic Black	15.9%		Whether child is non-Hispanic black (2 = yes)
Hispanic	20.2%		Whether child is Hispanic (3 = yes)
Other	20.9%		Whether child is of another race/ethnicity (4 = yes)
Child's age (in months)	24.4	2.5	Scores range from 20.1 to 38.2 months
Characteristics of child care			
Type of child care arrangements			
Relative care	25.4%		Whether child is in relative care (1 = yes)
Non-relative care	15.3%		Whether child is in non-relative care (2 = yes)
Center-based care	8.3%		Whether child is in center-based care (3 = yes)

Table 1 continued

Variables	*M* (%)	*SD*	Description
Multiple care arrangements	80.0%		Whether child is in multiple care arrangements (4 = yes)
Not in child care	50.3%		Whether child is not in non-parental care (5 = yes)
Outcome variables			
Social and emotional well-being			
Toddler Attachment Sort Classification (TAS-45)	38.7%		Whether child is classified as being insecurely attached (1 = yes)
Cognitive/mental proficiency			
Bayley Short Form-Research Edition (BSF-R) scale	34.7	22.4	Scores range from 0 to 81.8

Note: Totals may not equal 100% due to rounding

Table 2 Standardized path coefficients for the structural equation models (see Figs. 1–2) describing relationships among household food insecurity and toddlers' social and emotional and cognitive outcomes at 24 months

	Insecure attachment	Sig.	Mental development	Sig.
Food insecurity effects on mediators				
Food insecurity → Parenting	−0.025		−0.022	
Food insecurity → Cognitive stimulation	−0.003		−0.011	
Food insecurity → Depression	0.183	***	0.180	***
Mediators on mediators				
Depression → Parenting	−0.031	*	−0.033	*
Depression → Cognitive stimulation	−0.015		−0.035	
Mediators on outcomes				
Food insecurity → Outcome	0.013		0.015	
Parenting → Outcome	−0.045	*	0.081	***
Cognitive stimulation → Outcome	−0.075		0.112	***
Depression → Outcome	0.002		−0.023	
N	7894		8944	
CFI	0.929		0.967	
WRMR/SRMR	0.586		0.009	
RMSEA	0.010		0.016	

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Models include controls for child gender, child age at assessment, family structure, household poverty index ratio, parent education level, maternal employment, mother's age at birth, mother's number of children, welfare receipt, insurance coverage, smoking in the child's home, and receipt of well-baby visits

insecurity is positively associated with depression ($\beta = 0.183$), which is in turn negatively associated with positive parenting ($\beta = -0.031$). More positive parenting practices reduce the likelihood of insecure attachment ($\beta = -0.045$).

Cognitive Development (Mental Proficiency)

Table 2 displays the standardized direct path coefficients for the model estimating the influence of food insecurity on cognitive development (mental proficiency) as well as the direct and indirect associations. Figure 2 displays the direct and indirect paths between food insecurity and the mental proficiency scores at 24 months. Including controls, this model has a reasonable fit (RMSEA = 0.016, CFI = 0.967, SRMR = 0.009).

Net of controls, there is no direct effect of food insecurity on cognitive development. Rather, higher levels of food insecurity work indirectly through depression and parenting practices to influence cognitive development. High levels of food insecurity are positively associated with depression ($\beta = 0.180$). Depression is negatively associated with more positive parenting practices ($\beta = -0.033$), and positive parenting practices are positively associated with mental proficiency ($\beta = 0.081$). The significant indirect association between food insecurity and mental proficiency operates through depression and parenting. Households with higher levels of food insecurity

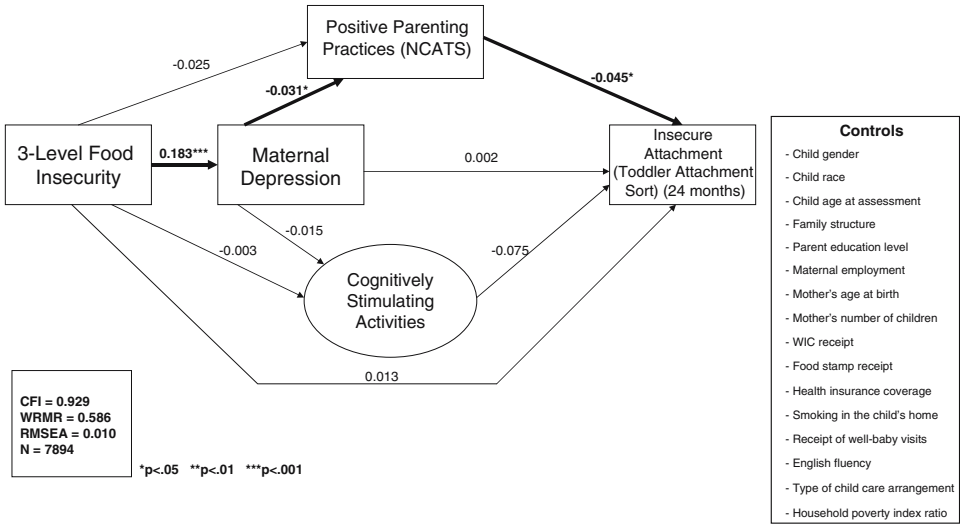

Fig. 1 Structural equation model of the associations between food insecurity and social and emotional development (ECLS-B)

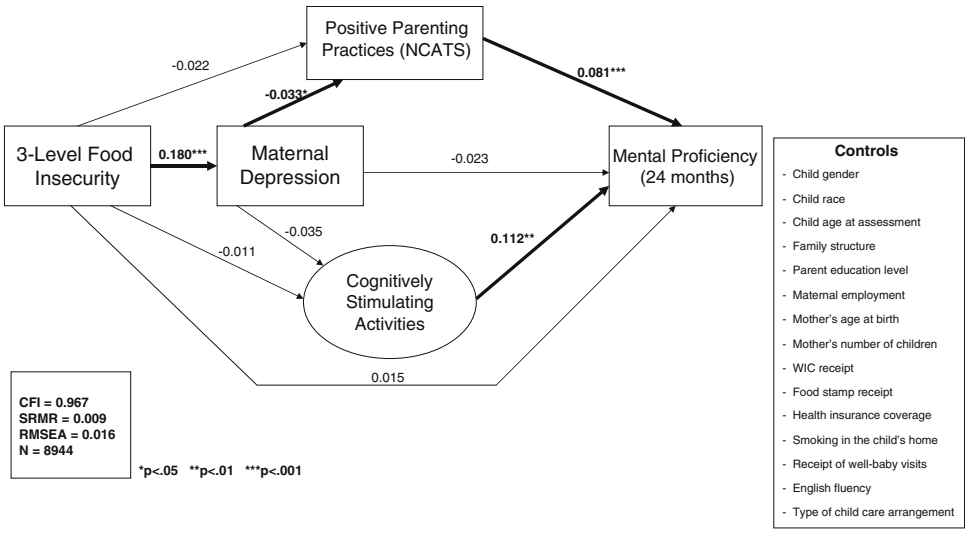

Fig. 2 Structural equation model of the associations between food insecurity and cognitive development (ECLS-B)

have higher levels of depression, and higher levels of depression reduce positive parenting, and more positive parenting is associated with more positive mental proficiency at 24 months.

Discussion

The results of this study support the perspective that food security affects children's development very early. More specifically, greater food insecurity, measured at nine months in a nationally representative sample of families with infants, predicted insecure child attachment and less advanced mental proficiency at 24 months, operating not directly but through food insecurity's influence on maternal depression and in turn on parenting practices. These results add to the earlier findings of the present research group indicating that food security also has implications for the overall health and overweight of toddlers [79]. Together, these results provide substantial support for the view that food security begins to influence children's development at very young ages.

The present study takes the next step of exploring a longitudinal model of the relationship between food insecurity and child social and emotional and cognitive outcomes, linking food insecurity, maternal mental health, observed parenting, cognitively stimulating activities and pattern of attachment as well as mental proficiency in the child. The models show reasonable fit in explaining the relationship between food insecurity and these particular child outcomes. The findings confirm the previously reported pattern of food insecurity predicting higher maternal depression. They indicate that food insecurity is not directly related to parenting practices. Rather, maternal depression mediates these relationships.

Interestingly, both the cognitive outcome (child's mental proficiency at 24 months) and security of attachment are predicted by positive parenting. These findings point to a

broadly applicable model, although there nevertheless may be specific variations according to the outcome being examined. Some previous research has found that maternal mental health only partially mediates the relationship between food insecurity and child social and emotional outcomes [6], while other research has found that a group of maternal characteristics (including depression, stress, and expression of warmth) fully mediated the relationship between food insufficiency and child outcomes [4]. It is possible that both maternal mental health and parenting behavior need to be taken into account for the relationship between food insecurity and child outcomes to be fully mediated. While observed positive parenting did predict the child outcomes considered here, counter to our expectations, cognitively stimulating activities did not. It is possible that the quality of mother-child interaction, as captured through direct observation, is more closely related to child outcomes than the frequency of certain interactions as reported on by mothers. It is also possible that maternal report variables are more subject to report biases.

Contributions of the Present Study

While previous research has proposed that food insecurity affects child social and emotional and cognitive outcomes through its effects on maternal mental health and parenting behavior, studies to date have not carried out an empirical examination of a model that includes all of the proposed linkages. Rather, pairs of variables have generally been examined in past research, such as the association between food insecurity and maternal mental health, or the link between food insecurity and specific child outcomes. This study uses a nationally representative longitudinal sample of infants and toddlers to do just that. We examined the specific mediating relationships that explain the relationship between food insecurity and social and emotional and cognitive outcomes for a sample of very young children.

These data permitted longitudinal analysis, and thus we are closer to being certain that relationships are causal. Further, the child outcome measures relied on informants other than the mother (observation or direct assessment), and so associations cannot be attributed to common method variance.

Limitations of the Present Study

This study has a number of limitations that should also be acknowledged. First, we relied on single measures for each domain of child development rather than on multiple measures for each. Further, the measure of child attachment security is not the "gold standard" for assessing this outcome, and new measures of infant and toddler behavior problems have recently been developed (the ITSEA and BITSEA; [80–82]). Thus, future work could more closely replicate and extend findings of studies with preschool-age and school-age children through examination of very early behavior problems. Additionally, although the BSF-R and TAS-45 were developed to retain the psychometric properties of the BSID-II and the Attachment Q-Sort [70], we have limited information on the validity and reliability of these two instruments. It is also possible that other pathways that we have not accounted for may contribute to some of the effects that we observe. Finally, the interpregnancy interval was not measured for mothers, nor was intimate partner violence, and so these were not included in the analyses.

Future Research

A meaningful extension of the present study would be to focus on fathers as well as mothers. Recent research indicates that depression affects parenting behavior among fathers [83]. The possibility exists that in two parent households, food insecurity affects depression and parenting in both parents. Research could examine whether patterns of depression and parenting are always parallel for mothers and fathers in two parent families experiencing food insecurity, or if there are some circumstances in which one parent only experiences depression and conveys it to the child through parenting behavior. Further work is needed that considers whether food insecurity shows differing patterns of association with child outcomes according to family risk. It will be particularly important to examine the hypothesis suggested by Alaimo [3] that the presence of family and child risk factors may diminish the extent to which variations in food insecurity is predictive of child outcomes. Future work could more closely replicate and extend findings of studies with preschool-age and school-age children through examination of very early behavior problems. In addition, a meta-analysis could yield more definitive results regarding the strength and consistency of the effects of food insecurity and insufficiency on child outcomes in the social and cognitive domains.

Policy Implications

Work such as the present study can help direct policy and program efforts, for example, potentially pointing to the need to address not only the sufficiency of food resources, but also maternal depression and parenting behavior. The present study indicates that food insecurity is present in over 10% of US households with infants. In addition, our findings indicate that food insecurity affects children's development very early in life. Together with our earlier results, the present study indicates that the effects of food insecurity, operating through maternal mental health and parenting

behaviors, predict child outcomes in the two major domains examined: social and emotional development and cognitive development. The results underscore the importance of programs and policies seeking to assure that families with infants have sufficient nutrition, available predictably. Such efforts have the potential to affect two generations: both mothers' psychological well-being and positive behaviors with their infants, and the children's development over the first two years. The findings raise the possibility that in families that have already been experiencing food insecurity, it may be beneficial to address not only the adequacy and reliability of food resources, but also maternal depression and less positive parenting behavior that may have developed in response to concerns about the adequacy of food.

References

1. Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. (2000). *Guide to measuring household food security*. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service.
2. Alaimo, K. (2005). Food insecurity in the United States: An overview. *Topics in Clinical Nutrition, 20*(4), 281–298.
3. Alaimo, K., Olson, C. M., & Frongillo, E. A. (2001). Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics, 108*(1), 44–53.
4. Slack, K. S., & Yoo, J. (2004). *Food hardships and child behavior problems among low-income children*. Insitute for Research on Poverty.
5. Kleinman, R. E., Murphy, J. M., Little, M., Pagano, M., Wehler, C. A., Regal, K., et al. (1998). Hunger in children in the United States: Potential behavioral and emotional correlates. *Pediatrics, 101*(1), 1–6.
6. Whitaker, R. C., Phillips, S. M., & Orzol, S. M. (2006). Food insecurity and the risks of depression and anxiety in mothers and behavior problems in their preschool-aged children. *Pediatrics, 118*(3), 859–868.
7. Reid, L. L. (2001). *The consequences of food insecurity for child well-being: An analysis of children's school achievement, psychological well-being, and health*. Panama City, FL: Florida State University.
8. Wu, Z., & Schimmele, C. M. (2005). Food insufficiency and depression. *Sociological Perspectives, 48*(4), 481–504.
9. Lovejoy, M. C., Graczyk, P. A., O'Hare E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review, 20*(5), 561–592.
10. Gamez-Galka, C. A. (2000). *Maternal depression: The influence of negativity on parental attitudes, self-efficacy, and parental behaviors*. Houston, TX: University of Houston.
11. Hoffman, C. (2006). *Maternal depression and parenting across the preschool period: Implications for regulatory competence and psychological functioning*. State College, PA: Pennsylvania State University.
12. Downey, G., & Coyne, J. C. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin, 108*(1), 50–76.
13. Whiffen, V. E., & Gotlib, I. H. (1989). Infants of postpartum depressed mothers: Temperament and cognitive status. *Journal of Abnormal Psychology, 98*(3), 274–279.
14. Kurstjens, S., & Wolke, D. (2001). Effects of maternal depression on cognitive development of children over the first 7 years of life. *Journal of Child Psychology and Psychiatry, 42*(5), 623–636.
15. Murray, L., Fiori-Cowley, A., Hooper, R., & Cooper, P. (1996). The impact of postnatal depression and associated adversity on early mother–infant interactions and later infant outcome. *Child Development, 67*, 2512–2526.
16. Murray, L., & Cooper, P. J. (1996). The impact of postpartum depression on child development. *International Review of Psychiatry, 8*(1), 55–63.
17. Dawson, G., Ashman, S. B., Panagiotides, H., Hessl, D., Self, J., Yamada, E., et al. (2003). Preschool outcomes of children of depressed mothers: Role of maternal behavior, contextual risk, and children's brain activity. *Child Development, 74*(4), 1158–1175.
18. Rosenblum, L. A., & Paully, G. S. (1984). The effects of varying environmental demands on maternal and infant behavior. *Child Development, 55*, 305–314.
19. Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1, Attachment*. New York: Basic Books.
20. De Wolff, M. S., & van IJzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*(4), 571–591.
21. Zaslow, M. J., Hair, E. C., Dion, M. R., Ahluwalia, S. K., & Sargent, J. (2001). Maternal depressive symptoms and low literacy as potential barriers to employment in a sample of families receiving welfare: Are there two-generational implications? Welfare, work, and well-being. *Women and Health, 32*(3), 211–251.
22. Zaslow, M. J., Weinfield, N. S., & Gallagher, M. (2006). Longitudinal prediction of child outcomes from differing measures of parenting in a low-income sample. *Developmental Psychology, 42*(1), 27–37.
23. Hofferth, S. L. (2004). *Persistence and change in the food security of families with children, 1997–1999*. Washington, DC: Economic Research Service, U.S. Department of Agriculture.
24. Laraia, B. A., Siega-Riz, A. M., Gundersen, C., & Dole, N. (2006). Psychosocial factors and socioeconomic indicators are associated with household food insecurity among pregnant women. *Journal of Nutrition, 136*, 177–182.
25. Cabrera, N., Shannon, J., West, J., & Brooks-Gunn, J. (2006). Parental interactions with Latino infants: Variation by country of origin and English proficiency. *Child Development, 74*(5), 1190–1207.
26. McAnarney, E. R., Lawrence, R. A., Ricciuti, H. N., Polley, J., & Szilagyi, M. (1986). Interactions of adolescent mothers and their 1-year-old children. *Pediatrics, 78*(4), 585–590.
27. Broussard, E. R. (1995). Infant attachment in a sample of adolescent mothers. *Child Psychiatry & Human Development, 25*(4), 211–219.
28. Williams, S. W., & Blunk, E. M. (2003). Sex differences in infant–mother attachment. *Psychological Reports, 92*(1), 84–88.
29. Pederson, D. R., Moran, G., Sitko, C., Campbell, K., Ghesquire, K., & Acton, H. (1990). Maternal sensitivity and the security of infant-mother attachment: A Q-sort study. *Child Development, 61*(6), 1974–1983.
30. Hofferth, S. L., & Reid, L. (2002). Early childbearing and children's achievement and behavior over time. *Perspectives on Sexual and Reproductive Health, 34*(1), 41–49.
31. Scher, A., & Mayseless, O. (2000). Mothers of anxious/ambivalent infants: Maternal characteristics and child-care context. *Child Development, 71*(6), 1629–1639.
32. Braungart-Rieker, J., Courtney, S., & Garwood, M. M. (1999). Mother– and father–infant attachment: Families in context. *Journal of Family Psychology, 13*(4), 535–553.
33. Benn, R. K. (1986). Factors promoting secure attachment relationships between employed mothers and their sons. *Child Development, 57*(5), 1224–1331.
34. Waldfogel, J., Han W.-J., & Brooks-Gunn, J. (2002). The effects of early maternal employment on child cognitive development. *Demography, 39*(2), 369–392.

35. Ruhm, C. J. (2004). Parental employment and child cognitive development. *The Journal of Human Resources, 39*(1), 155–192.
36. Garcia Coll, C. T. (1990). Developmental outcome of minority infants: A process oriented look into our beginnings. *Child Development, 61*, 270–289.
37. Blake, J. (1981). Family size and quality of children. *Demography, 18*, 621–662.
38. Blake, J. (1989). Number of siblings and educational attainment. *Science, 245*(4913), 32–36.
39. Dearing, E., Berry, Z., & Zaslow, M. (2006). Poverty during early childhood. In K. McCartney & D. Phillips (Eds.), *Handbook of early childhood development* (pp. 399–423). Oxford, England: Blackwell.
40. Aronson, S. R., & Huston, A. C. (2004). The mother–infant relationship in single, cohabiting, and married families: A case for marriage? *Journal of Family Psychology, 18*(1), 5–18.
41. Brown, S. L. (2004). Family structure and child well-being: The significance of parental cohabitation. *Journal of Marriage and Family, 66*, 351–367.
42. Tamis-LeMonda, C. S., Shannon, J. D., Cabrera, N. J., & Lamb, M. E. (2004). Fathers and mothers at play with their 2- and 3-year-olds: Contributions to language and cognitive development. *Child Development, 75*(6), 1806–1820.
43. Furness, B. W., Simon, P. A., Wold, C. M., & Asarian-Anderson, J. (2004). Prevalence and predictors of food insecurity among low-income households in Los Angeles County. *Public Health Nutrition, 7*, 791–794.
44. Petterson, S. M., & Albers, A. B. (2001). Effects of poverty and maternal depression on early childhood development. *Child Development, 72*(6), 1794–1813.
45. NICHD 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*(4), 795–810.
46. Herman, D. R., Harrison, G. G., Afifi, A. A., & Jenks, E. (2004). The effect of the WIC program on food security status of pregnant, first-time participants. *Family Economics and Nutrition Review, 16*(1), 21–30.
47. Hicks, L., Langham, R., & Takenaka, J. (1982). Cognitive and health measures following ealry nutritional supplementation: A sibling study. *American Journal of Public Health, 72*(10), 1110–1117.
48. U.S. Department of Agriculture Food, Nutrition Service. (1987). *The national WIC evaluation: An evaluation of the special supplemental food program for women, infants, and children. Vol. 1: Summary*. Alexandria, VA: U.S. Department of Agriculture.
49. Center on Hunger and Poverty. (1998). *Statement on the link between nutrition and cognitive development in children*. Waltham, MA: Center on Hunger and Poverty.
50. Rauh, V. A., Whyatt, R. M., Garfinkel, R., Andrews, H., Hoepner, L., Reyes, A., et al. (2004). Developmental effects of exposure to environmental tobacco smoke and material hardship among inner-city children. *Neurotoxicology and Teratology, 26*(3), 373–385.
51. Yolton, K., Dietrich, K., Auinger, P., Lanphear, B. P., & Hornung, R. (2005). Exposure to environmental tobacco smoke and cognitive abilities among U.S. children and adolescents. *Environmental Health Perspectives, 113*(1), 98–103.
52. Alaimo, K. (2000). *Consequences of food insufficiency for American children*. US: ProQuest Information & Learning.
53. Schor, E. L. (2004). Rethinking well-child care. *Pediatrics, 114*(1), 210–216.
54. Young, K. T., Davis, K., Schoen, C., & Parker, S. (1998). Listening to parents: A national survey of parents with young children. *Archives of Pediatrics and Adolescent Medicine, 152*, 255–262.
55. Regalado, M., & Halfon, N. (2001). Primary care services promoting optimal child development from birth to age 3 years: Review of the literature. *Archives of Pediatrics and Adolescent Medicine, 155*, 1311–1322.
56. Minkovitz, C. S., Strobino, D., Scharfstein, D., Hou, W., Miller, T., Mistry, K. B., et al. (2005). Maternal depressive symptoms and children's receipt of health care in the first 3 years of life. *Pediatrics, 115*(2), 306–314.
57. Caldaza, E. J., & Eyberg, S. M. (2002). Self-reported parenting practices in Dominican and Puerto Rican mothers of young children. *Journal of Clinical Child and Adolescent Psychology, 31*(3), 354–363.
58. Valera, R. E., Vernberg, E. M., Sanchez-Sosa, J. J., Riveros, A., Mitchell, M., & Mashunkashey, J. (2004). Parenting style of Mexican, Mexican-American, and Caucasian-non-Hispanic families: Social context and cultural influences. *Journal of Family Psychology, 18*(4), 651–657.
59. Steinberg, L., Elmen, J. D., & Mounts, N. S. (1989). Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child Development, 60*(6), 1424–1436.
60. Nord, M., Andrews, M., & Carlson, S. (2007). *Household food security in the United States, 2006*. Washington, DC: U.S. Department of Agriculture, Economic Research Service.
61. Schoppe-Sullivan, S. J., Diener, M. L., Mangelsdorf, S. C., Brown, G. L., McHale, J. L., & Frosch, C. A. (2006). Attachment and sensitivity in family context: The roles of parent and infant gender. *Infant and Child Development, 15*, 367–385.
62. Berglund, E., Eriksson, M., & Westerlund, M. (2005). Communicative skills in relation to gender, birth order, childcare and socioeconomic status in 18-month-old children. *Scandinavian Journal of Psychology, 46*(6), 485–491.
63. Magnuson, K. A., & Waldfogel, J. (2005). Early childhood care and education: Effects on ethnic and racial gaps in school readiness. *Future of Children (Special Issue on School Readiness: Closing Racial and Ethnic Gaps), 15*, 169–196.
64. NICHD Early Child Care Research Network. (2002). Early child care and children's development prior to school entry: Results from the NICHD study of early child care. *American Educational Research Journal, 39*(1), 133–164.
65. Nord, C., Edwards, B., Hilpert, R., Branden, L., Andreassen, C., Elmore, A., et al. (2004). *User's manual for the ECLS-B nine-month restricted-use data file and electronic code book*. Washington, DC: National Center For Educational Statistics.
66. Nord, C., Edwards, B., Andreassen, C., Green, J. L., Wallner-Allen, K., & Mulligan, G. (2006). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), user's manual for the ECLS-B longitudinal 9-month–2-year data file and electronic codebook (NCES 2006–046)*. Washington, DC: National Center for Educational Statistics.
67. Arbuckle, J. L. (1994). AMOS: Analysis of moment structures. *Psychometrika, 59*, 135–137.
68. Raykov, T., & Marcoulides, G. A. (2006). *A first course in structural equation modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
69. Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. *Monographs of the Society for Research in Child Development, 50*(1), 41–65.
70. Andreassen, C., & Fletcher, P. (2007). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) psychometric report for the 2-year data collection: Methodology report*. Washington, DC: National Center for Education Statistics.
71. Bayley, N. (1993). *Bayley Scales of Infant Development, second edition manual*. New York: Harcourt Brace & Company.

72. Andreassen, C., & Fletcher, P. (2005). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) methodology report for the nine-month data collection (2001–2002): Volume 1: Psychometric characteristics*. Washington, DC: National Center for Education Statistics.
73. Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401.
74. Sumner, G., & Spietz, A. L. (1995). *NCAST caregiver/parent–child interaction teaching manual*, (2nd ed.). Seattle, WA: NCAST Publications.
75. Kisker, E. E., Boller, K., Nagatoshi, C., Sciarrino, C., Jethwani, V., Zavitsky, T., et al. (2003). Early Head Start: Resources for measuring services & outcomes in Head Start programs serving infants and toddlers: Administration for Children and Families, April 27, 2003.
76. American Academy of Pediatrics. (2000). Recommendations for preventative pediatric health care. *Pediatrics, 105*(3), 645–646.
77. Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage Publications.
78. Muthén, L. K., & Muthén, B. O. (2006). *Mplus user's guide* (4th ed.). Los Angeles, CA: Muthén & Muthén.
79. Bronte-Tinkew, J., Zaslow, M. J., Capps, R., Horowitz, A., Moore, K. A., & McNamara, M. (2007). *Food insecurity is associated with obesity and poorer health for infants and toddlers*. Washington, D.C.: United States Department of Agriculture.
80. Briggs-Gowan, M. J., & Carter, A. S. (2002). *Brief-Infant-Toddler Social and Emotional Assessment (BITSEA): Manual* (2nd ed.). New Haven, CT: Yale University.
81. Carter, A. S., & Briggs-Gowan, M. J., (2001). *Infant-Toddler Social and Emotional Assessment (ITSEA) manual*, Version 1.1: Unpublished manual available from authors: ITSEA@yale.edu.
82. Carter, A. S., & Briggs-Gowan, M. J. (2003). The Infant Toddler Social and Emotional Assessment (ITSEA): Factor structure, reliability, and validity. *Journal of Abnormal Child Psychology, 31*, 495–514.
83. Bronte-Tinkew, J., Moore, K., Matthews, G., & Carrano, J. (2007). Symptoms of major depression in a sample of fathers of infants: Socio-demographic correlates and links to father involvement. *Journal of Family Issues, 28*(1), 61–99.