



# Maternal responsivity to infants in the “High Chair” assessment: Longitudinal relations with toddler outcomes in a diverse, low-income sample



Colleen R. O’Neal<sup>a,\*</sup>, Lynsey Weston<sup>a</sup>, Jeanne Brooks-Gunn<sup>b</sup>, Lisa J. Berlin<sup>c</sup>, Ranga Atapattu<sup>a</sup>

<sup>a</sup> University of Maryland, College Park, United States

<sup>b</sup> Teachers College, Columbia University, United States

<sup>c</sup> University of Maryland, Baltimore, United States

## ARTICLE INFO

### Keywords:

Infancy  
Parenting  
Stress  
Cognitive  
Emotion

## ABSTRACT

Infant–parent interactions occur across many situations, yet most home-based assessments of parenting behaviors are conducted under conditions of low stress, such as free play. In this study, low-income mothers from the Early Head Start Research and Evaluation Project were observed at home interacting with their 14-month-olds in the mildly stressful “High Chair” assessment ( $n = 1718$  dyads). This methodological study tested whether High Chair maternal responsiveness and detachment predicted later toddler cognitive and emotion outcomes, over and above equivalent maternal predictors during free play. High Chair responsiveness and detachment were significant, although modest, predictors of child cognitive and emotion outcomes, over and above maternal responsiveness and detachment during free play; except High Chair responsiveness did not predict the emotion outcome. There were no significant differences between ethnic groups in prediction of outcomes. Results are discussed in terms of the methodological value of assessing parenting behaviors across diverse situations and populations.

## 1. Introduction

Infant–parent interactions occur in a variety of situations throughout the day, like bathing, dressing, feeding, and playing. Also, parents have other responsibilities, such that infants and toddlers are often left on their own in visual or auditory range of the parent. Play with the parent is only one activity, and it takes up a small portion of an infant’s day (e.g., Britto, Fuligni, & Brooks-Gunn, 2002; Hofferth & Sandberg, 2001). However, virtually all home-based observation systems focus on play, reading, or, in fewer circumstances, feeding or mealtime. It is important that home-based, infant–parent interaction assessments capture the full range of stressful situations across diverse families.

This study fills a methodological gap in the area of low-income infant–parent interactions by examining a novel parenting assessment across diverse situations and families. This paper focuses on the unique methodological contribution of a mildly stressful, ecologically-relevant task in the home to later child outcomes, above and beyond a low stress, free play task in the home, and how such relations may differ across ethnic groups. In the Early Head Start Research and Evaluation Project (EHSREP; Love, Chazan-Cohen, Raikes, & Brooks-Gunn, 2013; Love et al., 2002), we wanted to observe low-income mothers with their infants in a more

\* Corresponding author at: University of Maryland, College Park, 3212 Benjamin Building, College Park, MD 20742, United States.  
E-mail address: [onealc01@umd.edu](mailto:onealc01@umd.edu) (C.R. O’Neal).

stressful activity than play and reading, which was assessed using the EHSREP Three Bag free play assessment (Fulgini & Brooks-Gunn, 2013). To that end, a modification of the original High Chair assessment (Martin, 1981; Shaw, Keenan, & Vondra, 1994) was implemented when the children were 14 months of age (Authors, 1997). The goal was to create a distraction situation which measures behavior when the mother is engaged in another task. Both the EHSREP High Chair and the Three Bag assessment were conducted in the homes of almost 2000 families at the end of infancy. The EHSREP was the first large multi-site sample of low-income, diverse families using infant–mother videotaped observations in the home when infants were 1, 2, 3, and 4 years of age (Brooks-Gunn, Fulgini, & Berlin, 2003; Love et al., 2002). This paper (a) describes the coding system and procedure used for the High Chair assessment; (b) examines associations between maternal behaviors observed in the High Chair and the Three Bag free play assessment; (c) tests whether the High Chair assessment is predictive of child behavior about a year later (i.e., 24 months of age at follow-up), after adjusting for the Three Bag assessment; and (d) explores how prediction of child outcomes differs by ethnicity. This study makes a methodological contribution to the literature, and we rely on a methodological frame to discuss the literature and results.

This paper examined responsive and detached parenting in response to the infant across stressful versus low-stress situations, and, in turn, the consequences for later toddler outcomes. Similarly, attachment theory highlights the importance of parents' responses to infant distress during a stressful situation for the development of the infant's attachment security; such attachment security contributes to subsequent socioemotional and cognitive development (e.g., Cassidy & Shaver, 2016). Mothers' behavior is believed to be both a response to child emotions and behavior as well as an indicator of maternal overall sensitivity and detachment (Sroufe, 1985). Most theoretical frameworks assume that mothers' behaviors, as observed in a particular situation, are somewhat representative of behavior in other situations. How maternal behavior differs as a function of the situation or stress level (e.g., play versus distraction) is not well-studied, and less is known about within-mother variability across play, feeding, and distraction. It is important to expand the assessment of infant–parent interactions across various situations because different situations magnify different components of interactions which may be less likely in free play, including infant expression and containment of negative affect in addition to maternal response to infant negative emotions (e.g., Goldsmith & Rothbart, 1996). Parenting in a more stressful situation may explain different variation in child outcomes than parenting in a less stressful situation.

### 1.1. Challenge tasks

While mothers may guide the child in a free play situation, free play tasks allow mothers to follow the child's lead as well. In other more challenging situations, some tasks require mothers to direct their children's behavior – finishing eating, getting dressed, going to bed, as everyday examples. In real life and experimental challenging situations, investigators have asked the mother to guide an infant–parent interaction, even if the infant is uninterested in interacting in that way. In the High Chair task, the mother is asked to put the infant in the high chair for four minutes, which constrains the infant's mobility which, in turn, may affect some infants' behavior.

Stressful challenge tasks play an important role compared to lower stress assessments like free play tasks. An often occurring behavior in the home involves putting toys and materials away (i.e., “clean-up” task), which has been used as a challenge task in many observational studies. In clean-up tasks, mothers and children are asked to return the toys to a bag or box, even if the infants and toddlers wish to continue playing (Kochanska, Coy, & Murray, 2001). A variant is the toy removal task (e.g., Vernon-Feagans & Cox, 2013). More than 30 years of attachment research have employed the Strange Situation which relies on the unfamiliarity of the laboratory, a female “stranger,” and two infant–parent separations to activate the infant's attachment system and, thus, assess the infant's attachment security (Ainsworth & Bell, 1970). Emotion-inducing challenge tasks involve fear/startle-induction or restraint of the child (LAB-TAB; Goldsmith & Rothbart, 1996).

Another example of a challenge task is the High Chair assessment (Martin, 1981; Shaw et al., 1994) which we adapted for the EHSREP (Authors, 1997). The High Chair assessment involved the child seated in a high chair in front of the mother, facing away from the mother, without a toy, as the mother was distracted by completing a task. In clean-up, the parent is directed to pay attention to the child and accomplish a child-related task, while in the High Chair task, the parent is working on an activity which is not related to the child's activities in the High Chair; the High Chair also represents a different aspect of the typical caregiving day than clean-up. The High Chair task combines many elements of the different situational, emotional, and relational demands of these multiple existing tasks. For instance, the High Chair employs elements of (a) infant–parent separation to induce infant distress, although to a lesser degree than the Strange Situation; (b) maternal distraction from the infant, similar to Tronick's Still-Face Paradigm which guides parents to not make eye contact with their infants (Tronick, Als, Adamson, Wise, & Brazelton, 1978); and (c) the situational demand on the mother to make the child do something the child does not typically want to do, similar to the demands of the clean-up task. Indeed, the High Chair is novel in its combination of external validity (e.g., many parents place their infants in a high chair for several minutes when they need to attend to another task; Lozoff & Brittenham, 1979) and feasibility (e.g., the High Chair can be used in people's homes). Finally, the High Chair task addresses the need for an assessment in the home which is more challenging than free play and mildly stressful. In sum, stressful challenge tasks make a methodological contribution to the literature by being designed to guide or restrict behavior with the goal of eliciting parenting and child behavior in a different way than lower stress tasks like free play.

### 1.2. Relations between parenting in challenge and free play assessments

One goal of this paper was to examine associations between maternal behaviors observed in the High Chair and the Three Bag free

**Table 1**  
High Chair and Three Bag scales.

Scale name	High Chair responsiveness	High Chair detachment	High Chair infant distress	Three Bag responsiveness	Three Bag detachment	Three Bag child negativity
Scale description	Combination of Sensitivity (i.e., parent's "tuning in" to the child's emotional state and need) and positive regard (i.e., expression of love, admiration, and respect for the child)	Lack of awareness of, attention to, or engagement with the child	Infant vocalizations of frustration or upset; vocalizations accompanied by facial negative affect or other non-verbal behavior	Combination of sensitivity and positive regard (see Fuligni & Brooks-Gunn, 2013)	Lack of attention to child needs and actions; lack of interest in the interaction	Child negativity toward mother during Three Bag task; the degree to which the child shows anger or hostility toward the mother; both frequency and intensity are considered
Very low score (1) characteristics	Adult centered reactions; inappropriate responses; low levels of positive expressions	Clear emotional involvement when interacting with the child; can be sensitive or intrusive	Infant only demonstrated neutral or positive affect	Adult centered reactions; not taking into account child mood and actions	Frequent eye contact; responsiveness to child vocalizations and cues; consistent attentiveness to what the child does	No overt or covert child indicators of hostility
Moderate score (4) characteristics	Relatively equal amounts of adult and child centered interactions, and inappropriate and appropriate responses; some (but not frequent) positive expressions	Equal amounts of detachment and involvement	Infant displayed persistent fussing or a single bout of crying, separated by longer periods of calm	Relatively equal amounts of adult and child centered reactions; equal amounts of responding to and not considering child's vocal and emotional cues	Inconsistent eye contact and responsiveness to child vocalizations and cues; inconsistent attentiveness and engagement with child's actions	Moderate frequency and intensity of child anger/frustration expressions toward the mother
Very high score (7) characteristics	Child centered interactions; appropriately responsive; frequent positive expressions	Almost no attention given to child; no emotional involvement; behaviors mechanical or stereotyped	Infant displayed full intensity crying or screaming and/or non-verbal expression of distress	Responding to child's vocal and emotional cues; not being overly controlling; positive expressions	No eye contact or response to child vocalizations and cues; unaware of child's actions	High frequency and intensity of child anger/frustration expressions toward the mother
M (SD)	2.93 (1.52)	4.35 (1.93)	3.58 (1.78)	4.10 (1.12)	1.61 (.99)	2.12 (1.12)

Note. Assessment scales were employed when the child was 14 months old. Three Bag scales descriptions adapted from Fuligni and Brooks-Gunn (2013).  $n = 1771$ – $1916$ .

play assessment. The EHSREP "Three Bag" free play assessment and coding system (Table 2; Fuligni & Brooks-Gunn, 2013) was adapted from the NICHD Early Child Care study (i.e., Three Box task; NICHD Early Child Care Research Network, 1999) with two different bags of toys and one bag containing a book (Britto & Brooks-Gunn, 2001; Brooks-Gunn, Liaw, Michael, & Zamsky, 1992). The Three Bag variables of interest in this study were maternal supportiveness and detachment; Three Bag supportiveness is an average of sensitivity, positive regard, and cognitive stimulation codes (Fuligni & Brooks-Gunn, 2013). The High Chair coding system also coded analogous maternal sensitivity, positive regard, and detachment, but not cognitive stimulation. With the goal of creating analogous parenting variables with which to compare Three Bag and High Chair effects, we created an average of sensitivity and positive regard for both the Three Bag and High Chair and labeled it responsiveness. The correlation between High Chair sensitivity and positive regard was so high, as it was with Three Bag sensitivity and positive regard (Fuligni & Brooks-Gunn, 2013), that the two variables worked best as a combined variable. Sensitivity is defined as child-centered "tuning in" (see Table 1). Sensitive parenting is characterized by behaviors such as validating the child's distress in a sympathetic tone (e.g., "Oh, you are so sad."). Positive regard is operationalized as a parent's expressions of love, admiration, and respect for the child. Detachment is operationalized as the quantity and quality of a parent's attention to and engagement with the child. A detached parent appears uninterested or passive when interacting with the child.

We expected only modest associations between equivalent parenting in the Three Bag and High Chair because the goal of the High Chair was different – the High Chair was designed to determine how a parent and infant respond to the challenge of the child being constrained in a seat with the mother behind him/her, while the mother is distracted by completing a task. As a result, in the only study published thus far including the EHSREP High Chair assessment, the High Chair has been conceptualized as more challenging than the free play Three Bag assessment (Lugo-Gil & Tamis-LeMonda, 2008); this study, however, did not test whether relations between parenting and child outcomes were significant for High Chair parenting, above and beyond Three Bag parenting. There has been little research on associations of within-mother behavior across tasks evoking different stress levels. We expect only modest, rather than strong, associations between equivalent maternal behavior across tasks because even mildly stressful assessments like the High Chair may evoke different parenting behaviors than low stress tasks like free play.

### 1.3. Parenting in different situations and child cognitive and emotional outcomes

The major goal of this paper was to test if maternal behaviors during the High Chair assessment would predict child outcomes approximately one year later, above and beyond free play Three Bag predictors. EHSREP Three Bag supportiveness and detachment, among other predictors, have been found to be associated with child outcomes, with positive associations of Three Bag supportiveness and negative relations of Three Bag detachment with child cognitive and language outcomes (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Regarding cognitive outcomes, EHSREP parenting quality was associated with 14 month cognitive outcomes in one study (Lugo-Gil & Tamis-LeMonda, 2008). Parenting quality in the study was assessed at 14 months via a composite of three scales: EHSREP Three Bag supportiveness, High Chair supportiveness (i.e., sensitivity and positive regard), and parenting via the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 2003) total score. Lugo-Gil and Tamis-LeMonda (2008), however, did not isolate how parenting in the different situations of the High Chair versus Three Bag affected child cognitive outcomes. Maternal sensitivity in infant–mother, semi-structured Three Box free play interactions in the home (NICHD Early Child Care Research Network, 1999) predicted language outcomes (Leigh, Nievar, & Nathans, 2011). Most language outcome studies, however, have small samples (e.g. Baumwell, Tamis-LeMonda, & Bornstein, 1997; Landry, Smith, Swank, Assel, & Vellet, 2001), unlike the current large-scale study.

Regarding cognitive, language, and behavioral outcomes, the Family Life Project ( $N = 1292$ ; Vernon-Feagans & Cox, 2013) included rural families and was one of the few large-scale studies that implemented both low (e.g., free play) and high challenge infant–parent interaction (e.g., Lab-TAB, Toy Removal; Willoughby, Stifter, Gottfredson, 2015) assessments in the home, along with assessing child cognitive, language, and behavioral outcomes. Vernon-Feagans and Cox (2013) reported that positive and negative parenting in infant–parent interactions were significant mediators of the relation between early cumulative risk and 36-month-old child executive functioning, language, and behavioral development; the study did not, however, report a comparison of parenting effects on child outcomes in high versus low challenge assessments.

Regarding behavioral outcomes, Martin (1981) created the High Chair assessment with a sample of 49 middle and upper-middle class mothers and their 10-month-old infants in the laboratory with the goal of testing the effect of infant–parent “mismatch” on later child behavior. “Mismatch” was operationalized as a highly demanding infant and an unresponsive mother in the High Chair assessment. For boys, an infant–mother mismatch resulted in more child demanding behavior at 42 months. Shaw et al. (1998) reported similar results with later parent-reported externalizing behavior for 100 low-income European American families. Studies of parenting and child cognitive, language, and behavioral/emotional outcomes suggest that positive and negative parenting, similar to supportiveness and detachment, are related to later child outcomes. Few studies, however, have tested the relations between parenting and child outcomes across different infant–parent interaction situations. The value in examining parenting in the High Chair versus the Three Bag task is that it is not yet clear if parenting in non-free play situations is predictive of child outcomes, above and beyond free play parenting.

#### 1.3.1. Differences by race and ethnicity

A cultural-ecological perspective posits that relations between parenting and child emotional competence can differ depending on the culture (Ogbu, 1981). For instance, expressing an emotion like anger may lead to a positive child outcome in one cultural context over another, with different parenting practices and child consequences across cultures, as a result (Halberstadt, Denham, & Dunsmore, 2001). In the EHS Three Bag, some ethnic differences in the relations of parenting with child outcomes have been found. Three Bag detached and harsh parenting were associated with lower cognitive development scores for White and Black dyads whereas directive parenting styles were associated with lower cognitive development scores in Latina/o dyads (Brady-Smith et al., 2013). Across all ethnic groups, low parent directiveness predicted low child negativity (Ispa et al., 2013). Given the lack of clarity in the literature around ethnic differences in relations of parenting constructs with child outcomes, we did not make a prediction, but, rather, explored ethnic differences.

### 1.4. Hypotheses

The primary goal of this study was to test if the predictive power of parenting in the EHS High Chair with later child outcomes remains significant above and beyond corresponding Three Bag free play parenting predictors. We expected low to moderate associations between parenting in the High Chair and Three Bag assessments. We also expected significant relations of High Chair responsiveness and detachment with toddler outcomes. We further expected that High Chair parenting behaviors would remain significant in explaining toddler outcomes above and beyond corresponding Three Bag free play parenting predictors. Finally, we explored whether or not the predictive strength of the High Chair task differed by ethnic group.

## 2. Method

### 2.1. Sample

The sample for the current study ( $N = 1718$  dyads) participated in the EHSREP (for additional demographic details, see Fuligni & Brooks-Gunn, 2013; Love et al., 2013, 2002), a 17-site, longitudinal evaluation of some of the first federally funded EHS programs for low-income infants, toddlers, and their families. All of the families met the federal poverty cutoff. EHS program evaluation data was collected from 1996 to 2010 on 3001 low-income families, with random assignment to the intervention group

**Table 2**  
Sample demographics.

	14 month videotaped High Chair full sample % (N = 1718)	White % (N = 714)	Black % (N = 595)	Latina/o % (N = 409)
<b>Child characteristics</b>				
Focus child is male	52	51	52	56
EHS treatment group	48	50	53	53
Low birth weight <sup>a</sup> (< 2500 g)	8	8	10	7
Focus child is firstborn <sup>b</sup>	62	60	71	54
<b>Maternal characteristics</b>				
<b>Race</b>				
White	42			
Black	35			
Latina/o	24			
<b>Maternal education<sup>c</sup></b>				
High school dropout	45	29	47	73
High school diploma or GED	30	38	28	16
More than diploma or GED	25	33	25	11
<b>Maternal age<sup>d</sup></b>				
Teen-aged (< 19 years) at child's birth	42	32	55	42
<b>Living arrangement</b>				
Lives alone	33	32	44	23
Lives with spouse	27	37	7	38
Lives with other adults	40	31	49	39
<b>Primary language<sup>e</sup></b>				
English	80	95	98	25
<b>Poverty level<sup>f</sup></b>				
< 33% of FPL	28	23	41	22
33–99% of FPL	57	60	46	66
100% or more of FPL	15	17	13	12
<b>Employment status<sup>g</sup></b>				
Employed	24	27	22	23
School/training	23	16	36	16
Neither employed nor in school	53	57	42	61

<sup>a</sup>  $N_{\text{Total}} = 1196$ ;  $N_{\text{White}} = 472$ ;  $N_{\text{Black}} = 398$ ;  $N_{\text{Latina/o}} = 326$ .

<sup>b</sup>  $N_{\text{Total}} = 1709$ ;  $N_{\text{White}} = 711$ ;  $N_{\text{Black}} = 591$ ;  $N_{\text{Latina/o}} = 407$ .

<sup>c</sup>  $N_{\text{Total}} = 1673$ ;  $N_{\text{White}} = 704$ ;  $N_{\text{Black}} = 581$ ;  $N_{\text{Latina/o}} = 388$ .

<sup>d</sup>  $N_{\text{Total}} = 1709$ ;  $N_{\text{White}} = 711$ ;  $N_{\text{Black}} = 591$ ;  $N_{\text{Latina/o}} = 407$ .

<sup>e</sup>  $N_{\text{Total}} = 1680$ ;  $N_{\text{White}} = 691$ ;  $N_{\text{Black}} = 583$ ;  $N_{\text{Latina/o}} = 406$ .

<sup>f</sup>  $N_{\text{Total}} = 1426$ ;  $N_{\text{White}} = 633$ ;  $N_{\text{Black}} = 458$ ;  $N_{\text{Latina/o}} = 335$ .

<sup>g</sup>  $N_{\text{Total}} = 1685$ ;  $N_{\text{White}} = 708$ ;  $N_{\text{Black}} = 583$ ;  $N_{\text{Latina/o}} = 394$ .

who received EHS services or to the control group who were free to access community services. Written parent consent for themselves and their children was obtained prior to data collection. Data collection occurred at baseline (before children were 1 year old) and then again at ages 14, 24, 36 months approximately 5 years old. Data collection procedures consisted of at-home visits with families. Mothers and children were interviewed, assessed, and observed in semi-structured interactions which were videotaped and coded. While the original baseline EHSREP sample included 3001 families, 1846 dyads were videotaped for the High Chair task at 14 months, and 1957 dyads were videotaped and coded for the Three Bag task at 14 months. 1821 dyads have both High Chair and Three Bag variables coded at 14 months. Of those 1821 dyads, we included 1718 dyads in our sample in order to focus on White, Black, and Latina/o groups; we excluded 4.9% who reported their ethnicity as “other.”

Compared to participants without complete High Chair data, this study's subsample with High Chair data was more likely to be White,  $t(2, 566) = 2.57, p = .01$ , to have a higher income,  $t(2, 678) = -2.68, p < .01$ , to have obtained at least a high school degree,  $t(2, 877) = -4.59, p < .001$ , and to be either employed, in school, or in a training program,  $t(2, 895) = 2.59, p = .01$ . This subsample was also less likely to have partners,  $t(2, 536) = 3.87, p < .001$ .

Of the 1718 dyads, 42% of families reported that they were White, 35% Black, and 24% were Latina/o (see demographics in Table 2). Of the 409 Latina/o families in the study, 79.5% were Mexican American, 8.5% were Central American, 5.2% were Puerto Rican, 2.7% were “Other Latina/o,” and .1% were Cuban American. Of the 64% of Mexican American mothers with generational status data reported, 12.6% were immigrants to the U.S., 4% were 1st generation U.S. citizens, and 83.4% were 2nd generation U.S. citizens (Isapa et al., 2004).

Black children were more likely to be living in deep poverty (less than one-third of the federal poverty threshold;  $F(2, 1715) = 16.14, p < .001$ ), to reside in a single-family household,  $F(2, 1715) = 72.52, p < .001$ , and to have a teenage mother,  $F(2, 1706) = 35.61, p < .001$ , compared to other ethnic groups. Latina mothers were most likely to not have completed high school,  $F(2, 1715) = 7.52, p < .01$ , and to have a primary language other than English,  $F(2, 1677) = 1314.35, p < .001$ , compared to other ethnic groups.

## 2.2. Procedures

The data collection procedure involved one home visit to the dyad when the child was aged 14 months and one home visit when they were 24 months old. At the 14 month home visit, the Three Bag was first conducted, followed by the High Chair assessment. After these assessments, an examiner conducted the cognitive, emotional, and language assessments described below, while the parent completed parent-report measures included for the EHSREP (e.g., demographics questions). At the 24 month visit, the outcome variables used in this study were collected, in addition to the other measures collected for the rest of the EHSREP study.

## 2.3. Demographic factors

A number of background factors were included in model testing as controls: child gender, poverty level, educational level (ranging from high school dropout, high school degree or GED, to more than high school degree), marriage status (single mother), teen parenthood when the target child was born, and intervention status as participant or non-participant in the Early Head Start program. Ethnicity was not included as a demographic control because we explicitly tested ethnic differences.

## 2.4. Child outcomes

### 2.4.1. Bayley Mental Development Index (MDI)

The MDI of the Bayley Scales of Infant Development, Second Edition (BSID-II; Bayley, 1993) assessed child cognition at 14 and 24 months. The MDI is conducted by a trained examiner who presents test materials to the child and records the child's responses; the examiners were either part of local EHSREP research teams or from the office of the national contractor (Mathematica Policy Research). The MDI assesses early number understanding, sensory and perceptual skills, object constancy, problem solving, memory, language (e.g., vocalization), and social skills. The raw score of each correctly completed item is turned into a scale score, and all of the scale scores are averaged into composite scores which can be compared with established norms. The BSID has well-established reliability and validity (Bayley, 1993; Voigt et al., 2003).

### 2.4.2. Bayley Behavioral Rating Scales-II (BPRS; Bayley, 1993)

The BPRS Emotion Regulation (ER) and Orientation/Engagement (ENG) subscales are the examiner's observations of infant behavior during the MDI. The BPRS ratings were conducted immediately after the BSID-II (which included the MDI) was completed. For both subscales, global ratings relied on a five-point scale from low competence to high competence. BPRS Emotion Regulation assessed adaptability in changing activities, negative affect, and frustration. BPRS Orientation/Engagement measured cooperation, positive affect, and interest. The BPRS has well-established reliability (Bayley, 1993).

### 2.4.3. MacArthur Communicative Development Inventories (CDI; Fenson et al., 1993)

The CDI is a parent-report measure of infant's language abilities, particularly vocabulary size, with adequate reliability (Fenson et al., 1994). At 14 months, parents completed the Vocabulary Comprehension, Vocabulary Production, and Early Gestures subscales. At 24 months, parents were given Vocabulary Comprehension, Sentence Complexity, and Combining Words subscales. The CDI has well-established psychometrics (Fenson et al., 1993, 2000).

### 2.4.4. Latent child outcomes

We created a latent cognitive and latent emotion child outcome with the goal of parsimony, due to moderate correlations and construct similarity among outcome variables, and as an ideal way to account for measurement error (Hancock & Mueller, 2013). MDI and CDI served as observed indicators of the latent cognitive outcome and the BPRS-ER and ENG served as observed indicators of the latent emotion outcome. We also created 14 month equivalents of the 24 month latent outcomes. The Confirmatory Factor Analysis (CFA) using Mplus Version 7.4 (Muthén & Muthén, 1998–2011) fit very well for the 24 month outcomes, with RMSEA = .0, CFI = 1.00, and SRMR = .003; the loadings for ER and ENG onto the 24 month emotion outcome were .66 and .68, and the loadings for MDI and CDI onto the 24 month cognitive outcome were .89 and .53. The 14 month latent child outcome model fit was adequate, with RMSEA = .078, CFI = .98, and SRMR = .017; the loadings for ER and ENG onto the 14 month emotion outcome were .73 and .62, and the loadings for MDI and CDI onto the 14 month cognitive outcome were .86 and .26.

## 2.5. The High Chair assessment

The EHS High Chair assessment was conducted when children were 14 months of age (Authors, 1997). The assessment involved the infant being placed in a high chair in the infant's home for 4 minutes facing away from the parent, with the parent sitting 4 feet behind and a foot to the right of the infant completing one of the parent-report questionnaires included in the EHSREP study, so that infants can turn their heads to see the parent. No toys or other objects could be placed in front of the infant, and the high chair used was one brought by the examiner. Instructions were given asking the parent to complete the questionnaire. If parents asked if they could get up to tend to the child, the research assistants would say it is up to the parent and the parent can do whatever she would normally do. Training of in-home High Chair assessment examiners included training before implementation, a review of a subset of their implementation tapes in the beginning of the study, and periodic review throughout; ethnicity data is not available on the High Chair examiners.



**Table 3**  
Means and standard deviation of child outcomes.

Scales	Full sample		White		Black		Latina/o	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BBS MDI								
14 month <sup>a</sup>	98.22	11.23	98.79	12.40	97.57	10.05	98.17	10.66
24 month <sup>b</sup>	89.31	13.78	92.61	14.43	86.65	12.49	86.83	12.94
BBS Emotion Regulation								
14 month <sup>c</sup>	3.69	.69	3.71	.66	3.61	.68	3.79	.73
24 month <sup>d</sup>	3.63	.80	3.66	.78	3.50	.84	3.74	.75
BBS Engagement								
14 month <sup>e</sup>	3.53	.73	3.60	.69	3.57	.72	3.36	.83
24 month <sup>f</sup>	3.62	.76	3.77	.71	3.57	.72	3.41	.86
14 month MacArthur CDI <sup>g,i</sup>	24.35	9.56	24.59	9.46	25.51	9.87	22.12	8.89
24 month MacArthur CDI <sup>h,j</sup>	21.50	9.82	23.19	10.43	21.12	8.55	18.91	9.83

Note. MDI = Bayley Mental Developmental Index. BBS = Bayley Behavior Rating Scale. CDI = Communicative Development Inventories. Range for BBS subscales = 4, except for 14 month Emotion Regulation, where range = 3.86, and for MDI, where range = 81 at 14 months and 85 at 24 months. The ranges for 14 month MacArthur CDI Vocabulary Comprehension, 14 month MacArthur CDI Vocabulary Production, 14 month MacArthur CDI Early Gestures scales = 89, 83, and 18, respectively. The ranges for the 24 month MacArthur CDI Vocabulary Production, the 24 month MacArthur CDI Sentence Complexity, and the 24 month Combining Words scales = 100, 37, and 1, respectively.

<sup>a</sup>  $N_{\text{Total}} = 1532$ ;  $N_{\text{White}} = 642$ ;  $N_{\text{Black}} = 527$ ;  $N_{\text{Latina/o}} = 363$ .

<sup>b</sup>  $N_{\text{Total}} = 1259$ ;  $N_{\text{White}} = 552$ ;  $N_{\text{Black}} = 408$ ;  $N_{\text{Latina/o}} = 299$ .

<sup>c</sup>  $N_{\text{Total}} = 1647$ ;  $N_{\text{White}} = 687$ ;  $N_{\text{Black}} = 568$ ;  $N_{\text{Latina/o}} = 392$ .

<sup>d</sup>  $N_{\text{Total}} = 1348$ ;  $N_{\text{White}} = 584$ ;  $N_{\text{Black}} = 444$ ;  $N_{\text{Latina/o}} = 320$ .

<sup>e</sup>  $N_{\text{Total}} = 1662$ ;  $N_{\text{White}} = 691$ ;  $N_{\text{Black}} = 573$ ;  $N_{\text{Latina/o}} = 398$ .

<sup>f</sup>  $N_{\text{Total}} = 1351$ ;  $N_{\text{White}} = 583$ ;  $N_{\text{Black}} = 447$ ;  $N_{\text{Latina/o}} = 321$ .

<sup>g</sup>  $N_{\text{Total}} = 1380$ ;  $N_{\text{White}} = 559$ ;  $N_{\text{Black}} = 501$ ;  $N_{\text{Latina/o}} = 320$ .

<sup>h</sup>  $N_{\text{Total}} = 1330$ ;  $N_{\text{White}} = 572$ ;  $N_{\text{Black}} = 450$ ;  $N_{\text{Latina/o}} = 308$ .

<sup>i</sup> Average score from Early Gestures, Vocabulary Comprehension, and Vocabulary Production scales of the MacArthur Communicative Development Inventories.

<sup>j</sup> Average score from Sentence Complexity, Combining Words, and Vocabulary Production scales of the MacArthur Communicative Development Inventories.

Given the demands of coding approximately 2000 EHS interactions, the EHS High Chair coding system did not use a second-by-second microcoding method like [Martin \(1981\)](#) and [Shaw et al. \(1994, 1998\)](#) employed, but, rather, focused on global rating scales. We paralleled the Three Bag scales, using global ratings across the entire 4-minute interaction. The EHS High Chair parenting scales used to test predictive models in this study were responsiveness and detachment ([Table 1](#); [Authors, 1997](#)). Maternal responsiveness and detachment were coded on a 7-point scale, similar to the Three Bag scales with the same labels (see [Table 1](#)).

Maternal responsiveness was an average of sensitivity and positive regard, given the high correlation between the two ([Fulgini & Brooks-Gunn, 2013](#)). Sensitivity was defined as child-centered “tuning in” (see [Table 1](#)), characterized by behaviors such as validating the child's distress in a sympathetic tone (e.g., “Oh, you are so sad.”). Positive regard was operationalized as a parent's expressions of love, admiration, and respect for the child. Detachment was operationalized as a parent's lack of awareness of, attention to, or engagement with the child given the child's bids for attention and other cues. Infant distress was operationalized as vocal expressions of frustration (e.g., crying), negative facial affect, and nonverbal behavior (e.g., struggling to escape from the high chair), coded on a 7 point scale; distress was used as a control variable.

Behaviors were coded from videotapes according to strict protocols. The coders were blind to the treatment status of the families. The coding team was a small group of five graduate students (i.e., two Asian American, 3 European American coders), including a coder fluent in Spanish. Coders were not matched with the ethnicity of parent–child dyads; however, videotapes containing any Spanish were coded by the bilingual coder.

Training activities of coders included weekly meetings, discussions of the scales, and viewing of exemplars for each scale. Training tapes included examples of all ethnic groups. Coders were trained to a reliability criterion of 85% rater agreement (exact or within 1 point) with a “gold standard” coder. The “gold standard” coders were two graduate students who helped develop the coding system and were supervised by experts in parent–child interactions. Once coding began, 15% of tapes were randomly selected for weekly assessments of rater agreement with the “gold standard;” rater agreement ranged from 80 to 100%. Data on inter-rater agreement between individual coders are not available.

## 2.6. The Three Bag assessment

The EHSREP Three Bag assessment was adapted from the NICHD Three Box task ([NICHD Early Child Care Research Network, 1999](#)) and showed adequate psychometrics for the diverse, low-income EHS population ([Fulgini & Brooks-Gunn, 2013](#)). The EHS Three Bag was used when the child was 14 months old and involved an assessor giving the parent and infant two bags of toys and one bag with a book for 10 minutes of free play (for details see [Fulgini & Brooks-Gunn, 2013](#)). This study only used Three Bag responsiveness and detachment scales, in addition to the Three Bag child negativity scale ([Table 1](#)).

### 3. Results

This study examined if High Chair parenting behaviors predicted variation in later toddler outcomes, above and beyond equivalent Three Bag parenting. We also explored if such relations differed by ethnicity.

#### 3.1. Descriptives

Table 1 presents means and standard deviations for High Chair and Three Bag scales; Table 3 presents descriptives for child outcomes. Mean levels of High Chair responsiveness were lower than Three Bag responsiveness ( $t = 30.60$ ,  $df = 1667$ ,  $p < .001$ ), while mean levels of High Chair detachment were higher than Three Bag detachment ( $t = 54.82$ ,  $df = 1672$ ,  $p < .001$ ).

#### 3.2. Correlations between parenting in the two assessments

As expected, the two tasks had a low to low-moderate magnitude of relations, in expected directions, between High Chair and Three Bag responsiveness and between High Chair and Three Bag detachment (Table 4).

#### 3.3. Parenting and toddler outcomes

Correlational analyses revealed that 24 month child cognitive, language, and emotional outcomes had moderate, positive correlations with each other (see Table 4). Fourteen month High Chair responsiveness, in addition to Three Bag responsiveness, also had positive relations with outcomes. Fourteen month High Chair and Three Bag detachment were negatively associated with child outcomes, as expected.

#### 3.4. High Chair prediction of child outcomes

Using structural equation modeling (SEM) with Mplus Version 7.4 (Muthén & Muthén, 1998–2011), we tested two separate models: one model with both High Chair and Three Bag responsiveness as key predictors of latent cognitive and emotion outcomes in the same model, and another model with High Chair and Three Bag detachment as key predictors of latent cognitive and emotion outcomes. The models also included 14 month outcomes as control variables. The two models included two latent outcomes, as described in the measures section above: a latent cognitive and a latent emotion outcome; all models adjusted for demographics in addition to intervention status, 14 month High Chair child distress, and 14 month Three Bag child negativity. We set the outcomes at Time 1 to covary with the same outcome at Time 2 (e.g., 14 month latent emotion was set to be correlated with 24 month latent emotion outcome), and we set the latent Time 2 cognitive and emotion outcomes to covary with each other, so that the residuals of these outcomes would covary. Using robust estimation via MLR, we were able to employ full information maximum likelihood estimation that accommodates missingness and corrects for nonnormality.

Three Bag and High Chair responsiveness predicted latent cognitive and emotion outcomes, except High Chair responsiveness did not predict the emotion outcome. Three Bag and High Chair detachment were significant predictors of latent cognitive and emotion

**Table 4**  
Intercorrelations among 14 month High Chair, 14 month Three Bag, and 24 month child outcomes.

	24 month child outcomes				14 month High Chair scales	
	MDI	BBS Emotion Regulation	BBS Engagement	MacArthur CDI	Responsiveness	Detachment
<b>High Chair scales</b>						
Responsiveness	.23***	.10***	.15***	.20***	–	–
Detachment	–.19***	–.10***	–.14***	–.18***	–.89***	–
Child distress	.04	.01	.01	.05	–.13***	.09***
<b>Three Bag scales</b>						
Responsiveness	.34***	.20***	.23***	.24	.34***	–.28
Detachment	–.22***	–.16***	–.14***	–.15***	–.19***	.15***
Child negativity	–.15**	–.11**	–.09*	–.08*	–.12**	.10**
<b>24 Month child outcomes</b>						
MDI	–					
BBS Emotion regulation	.39***	–				
BBS Engagement	.40***	.45***	–			
MacArthur CDI	.48***	.23**	.25***	–		

Note.  $N$  ranges from 1232 to 1326 for correlations between 14 mo. High Chair Scales and 24 month outcomes;  $N$  ranges from 1249 to 1443 for correlations between 14 mo. Three Bag Scales and 24 month outcomes. MDI = Bayley Mental Developmental Index. BBS Emotion Regulation = Bayley Behavior Rating Scale Emotion Regulation scale. BBS Engagement = Bayley Behavior Rating Scale Orientation/Engagement scale. MacArthur CDI = average score from Sentence Complexity, Combining Words, and Vocabulary Production scales of the MacArthur Communicative Development Inventories.

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .



**Table 5**

High Chair and Three Bag responsiveness prediction of 24 month child cognitive and emotion outcomes for entire sample and by ethnic group, controlling for demographic variables, 14 month child distress, 14 month Three Bag child negativity, and 14 month child outcomes.

Predictors	Standardized estimate (standard error)			
	Full sample Cognitive/emotion outcome	White cognitive/emotion outcome	Black cognitive/emotion outcome	Latina/o cognitive/emotion outcome
<b>Demographics<sup>a</sup></b>				
Gender	-.05 (.03)/-.12 (.04) <sup>***</sup>	-.03 (.04)/-.12 (.04) <sup>**</sup>	-.03 (.05)/-.12 (.05) <sup>*</sup>	-.11 (.06)/-.14 (.05) <sup>*</sup>
Poverty	.05 (.03)/.02 (.03)	.01 (.04)/-.07 (.05)	.12 (.06) <sup>*</sup> /.08 (.06)	.02 (.06)/.02 (.07)
Education level	.15 (.03) <sup>***</sup> /.08 (.03) <sup>*</sup>	.16 (.05) <sup>**</sup> /.17 (.05) <sup>**</sup>	.10 (.06)/.00 (.06)	.12 (.06)/.09 (.06)
Single parent	.01 (.03)/-.05 (.03)	-.02 (.04)/-.08 (.05)	.08 (.05)/.06 (.05)	-.02 (.06)/-.09 (.06)
Teen parent	.06 (.03) <sup>*</sup> /.08 (.03)	.04 (.05)/.15 (.05) <sup>**</sup>	.06 (.07)/.06 (.06)	.10 (.05)/.00 (.06)
Intervention status	.08 (.03) <sup>**</sup> /.00 (.03)	.10 (.04) <sup>*</sup> /.-02 (.04)	.14 (.05) <sup>**</sup> /.07 (.05)	.02 (.06)/-.05 (.06)
14 month HC distress	.06 (.03) <sup>*</sup> /.09 (.04) <sup>*</sup>	.07 (.04)/.12 (.05) <sup>*</sup>	.06 (.05)/.08 (.06)	.02 (.07)/.03 (.07)
14 month Three Bag child negativity	-.04 (.03)/.00 (.03)	-.02 (.05)/-.01 (.05)	-.01 (.06)/-.01 (.06)	-.06 (.06)/.05 (.06)
14 mo. cog/emo outcome	.65 (.05) <sup>***</sup> /.31 (.04) <sup>***</sup>	.75 (.07) <sup>***</sup> /.38 (.07) <sup>***</sup>	.70 (.09) <sup>***</sup> /.29 (.08) <sup>***</sup>	.57 (.10) <sup>***</sup> /.24 (.09) <sup>***</sup>
Three Bag responsiveness	.10 (.04) <sup>**</sup> /.19 (.04) <sup>**</sup>	.01 (.05)/.19 (.05) <sup>**</sup>	.16 (.07) <sup>*</sup> /.13 (.06) <sup>*</sup>	.05 (.07)/.23 (.07) <sup>**</sup>
High Chair responsiveness	.10 (.03) <sup>**</sup> /.06 (.04)	.10 (.05) <sup>*</sup> /.11 (.05) <sup>*</sup>	-.02 (.06)/.01 (.07)	.06 (.07)/.01 (.07)

Note. Both outcomes were tested in the same SEM model, and demographics in addition to HC distress, Three Bag child negativity, and 14 month cognitive and emotion outcomes as controls.

<sup>a</sup> Demographic control variables included child gender (male), poverty, maternal education (high school dropout, high school degree or GED, and more than high school degree), single parenthood, teen parenthood when the target child was born, and participation in EHS intervention program.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

outcomes, except Three Bag detachment did not predict the cognitive outcome (Tables 5 and 6). While these predictors were significant in the expected direction, it is important to note their modest strength. The model fit was adequate with both the responsiveness model, RMSEA = .04, CFI = .94, and SRMR = .03, and the detachment model, RMSEA = .04, CFI = .94, and SRMR = .03. The recommended RMSEA cutoff is less than .06, CFI cutoff is more than .95, and SRMR cutoff is less than .08 (Hu & Bentler, 1999).

3.4.1. Relations between predictors and outcomes by ethnic group

Multisample modeling was conducted with the loadings of observed variables set to be equivalent onto latent outcomes across

**Table 6**

High Chair and Three Bag detachment prediction of 24 month child cognitive and emotion outcomes for entire sample and by ethnic group, controlling for demographic variables, 14 month child distress, 14 month Three Bag child negativity, and 14 month child outcomes.

Predictors	Standardized estimate (standard error)			
	Entire sample Cognitive/emotion outcome	White Cognitive/emotion outcome	Black Cognitive/emotion outcome	Latina/o Cognitive/emotion outcome
<b>Demographics<sup>a</sup></b>				
Gender	-.05 (.03) <sup>*</sup> /.-12 (.03) <sup>***</sup>	-.03 (.04)/-.13 (.04) <sup>**</sup>	-.03 (.05)/-.12 (.05) <sup>*</sup>	-.11 (.06)/-.15 (.06) <sup>**</sup>
Poverty	.05 (.03)/.03 (.04)	.01 (.04)/-.06 (.05)	.11 (.06) <sup>*</sup> /.08 (.06)	.02 (.06)/.01 (.07)
Education level	.16 (.03) <sup>***</sup> /.09 (.03) <sup>**</sup>	.16 (.05) <sup>**</sup> /.18 (.05) <sup>***</sup>	.12 (.06) <sup>*</sup> /.-01 (.06)	.13 (.06) <sup>*</sup> /.11 (.06) <sup>*</sup>
Single parent	.00 (.03)/-.05 (.03)	-.01 (.04)/-.08 (.05)	.06 (.05)/.06 (.05)	-.03 (.06)/-.09 (.06)
Teen parent	.05 (.03)/.07 (.03) <sup>*</sup>	.04 (.05)/.14 (.05) <sup>**</sup>	.03 (.07)/.06 (.06)	.11 (.05) <sup>*</sup> /.00 (.06)
Intervention status	.08 (.03) <sup>**</sup> /.00 (.03)	.09 (.04) <sup>*</sup> /.-01 (.04)	.14 (.05) <sup>*</sup> /.06 (.05)	.02 (.06)/-.04 (.06)
14 month HC distress	.07 (.03) <sup>*</sup> /.10 (.03) <sup>**</sup>	.07 (.04)/.13 (.05) <sup>**</sup>	.08 (.05)/.08 (.06)	.02 (.07)/.05 (.07)
14 month Three Bag child negativity	-.06 (.03) <sup>*</sup> /.-04 (.03) <sup>*</sup>	-.02 (.05)/-.05 (.05)	-.06 (.06)/-.03 (.06)	-.07 (.06)/.01 (.06)
14 mo. cog/emo outcome	.67 (.05) <sup>***</sup> /.32 (.04) <sup>***</sup>	.74 (.07) <sup>***</sup> /.41 (.07) <sup>***</sup>	.76 (.09) <sup>***</sup> /.30 (.07) <sup>***</sup>	.56 (.10) <sup>***</sup> /.26 (.08) <sup>***</sup>
Three Bag detachment	-.05 (.03)/-.15 (.03) <sup>**</sup>	-.05 (.05)/-.13 (.05) <sup>**</sup>	.03 (.07)/-.13 (.07)	-.10 (.06)/-.18 (.07) <sup>**</sup>
High Chair detachment	-.09 (.03) <sup>**</sup> /.-10 (.03) <sup>**</sup>	-.10 (.05)/-.15 (.05) <sup>**</sup>	.02 (.06)/-.03 (.07)	-.03 (.06)/-.06 (.07)

Note. Both outcomes were tested in the same SEM model, and demographics in addition to HC distress, Three Bag child negativity, and 14 month cognitive and emotion outcomes as controls.

<sup>a</sup> Demographic control variables included child gender (male), poverty, maternal education (high school dropout, high school degree or GED, and more than high school degree), single parenthood, teen parenthood when the target child was born, and participation in EHS intervention program.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

ethnic groups, and the intercepts were set to zero. The purpose of setting the loadings to be equivalent was to make sure that any differences across ethnic groups were not due to differences in loadings across ethnic groups. Multisample modeling illustrated that High Chair responsiveness and detachment predicted child cognitive and emotion outcomes for White dyads only (see Tables 5 and 6). In contrast, Three Bag responsiveness predicted emotion outcomes for White, Black, and Latina/o dyads, in addition to the cognitive outcome for Black dyads. Three Bag detachment predicted White and Latina/o emotion outcomes. Significant difference tests determined if the difference between ethnic groups on High Chair and Three Bag responsiveness and detachment prediction of outcomes was significantly different from zero, via the Mplus model constraint option. For instance, we tested if the difference between White and Black High Chair responsiveness prediction of the latent cognitive outcome was significantly different from zero. We did not find significant differences across ethnic groups in prediction of outcomes.

#### 4. Discussion

A call has been made for better measurement of parenting that promotes young children's development among diverse families in poverty (Annie E. Casey Foundation, 2013; Cabrera, 2013; Fuligni and Brooks-Gunn, 2013). The corpus of research on infant–parent interactions during free play has illustrated a great deal about maternal sensitivity, cognitive stimulation, harshness, detachment, and directiveness (Baumwell et al., 1997; Maccoby & Martin, 1983), and free play research has broadened to include much more diverse samples (e.g., Fuligni & Brooks-Gunn, 2013; Vernon-Feagans & Cox, 2013). The question remains of whether situations in the home other than free play are predictive of child outcomes. This study provides a methodological contribution to an understanding of how these important aspects of parenting under different stress levels relate to low-income child cognitive and emotion outcomes, and how the consequences of parenting may vary across ethnic groups. This methodological study addresses a well-documented need for more assessment of low-income, diverse parenting processes across different situations (e.g., Raver, 2004). We tested how much variance in toddler outcomes was explained by the High Chair assessment, above and beyond the Three Bag free play assessment. High Chair responsiveness and detachment were related to child outcomes above and beyond Three Bag responsiveness and detachment, except High Chair responsiveness did not predict the emotion outcome. The magnitudes of the predictors of later outcomes were small but significant. There were no significant differences between ethnic groups in prediction of outcomes.

While research has found that parenting plays an important role in the development of affective competence among diverse families (e.g., Halberstadt, Craig, Lozada, & Brown, 2011; Halberstadt et al., 2001), there have only been limited large-scale studies of diverse, low-income families testing the impact of early parenting across different situations (e.g., Vernon-Feagans & Cox, 2013). Based on Attachment theory (e.g., Cassidy & Shaver, 2016), the main goal of this study was to determine if the High Chair situation predicts child outcomes, after adjusting for free play maternal behavior. The High Chair maternal behaviors evoked modest but significant predictions to child outcomes one year later, above and beyond the contributions of parenting behaviors during a less challenging situation (free play); however, High Chair responsiveness did not predict the emotion outcome. Whereas it would have offered more support for the High Chair as a unique predictor if the results were of stronger magnitude, many important clinical assessments have held weak but significant predictive magnitude, especially in the field of health (e.g., Seidell, Muller, Sorkin, & Andres, 1992). Even small, but significant, predictors add value to painting the entire picture of infant and toddler behavior. This study was also unusual in testing a model which adjusted for a number of demographic predictors, which may have weakened the predictive power of the High Chair predictors. It is possible that if other studies had done the same, the magnitude of our findings may have been comparable.

These results suggest that theoretically important aspects of parenting have unique consequences for infant development, depending on the stressful nature of the assessment and the child outcome. Regarding the predictive power of detachment, perhaps an assessment like the High Chair may elicit more negative than positive emotions, which, in turn, may elicit enough variation in withdrawn and uninvolved parenting to detect consequences for child development (Tamis-LeMonda et al., 2004). Given that High Chair detachment predicted both outcomes, it may be a stronger predictor than High Chair responsiveness.

Three Bag responsiveness seems to have a stronger magnitude of prediction of emotion outcomes than High Chair responsiveness; Three Bag responsiveness prediction of cognitive outcomes was the same magnitude as High Chair responsiveness. Magnitudes of Three Bag and High Chair detachment predictors seemed more similar to each other. Perhaps free play's longer duration offers more opportunities for a range of responsive parenting and positive interactions compared to the brief High Chair task, facilitating the assessment of more variation in responsive parenting. Indeed, we did find that there were lower levels of responsiveness in the High Chair than the Three Bag; there was, however, more variation in High Chair than Three Bag responsiveness and detachment. The modest but significant High Chair predictors (e.g., High Chair detachment), above and beyond equivalent individual Three Bag predictors (e.g., Three Bag detachment), gave some empirical support for further research examining parenting in a full range of situations to best capture the full range of variation in parenting, and, in turn, the full range of impact on children's cognitive, language, and emotional development.

Is the High Chair akin to emotion-inducing situations? Emotion-inducing tasks are typically laboratory assessments designed to elicit infants' negative emotions (e.g., Goldsmith & Rothbart, 1996). These assessments, thus, may require different parenting skills (e.g., the skill of remaining sensitive in response to infant distress) than tasks like free play, but this remains an empirical question. Longitudinal emotion-inducing studies done in the laboratory provide some evidence for infant emotion and parent response to infant emotions having an effect on later child cognitive, emotion, and behavioral outcomes (e.g., Malatesta et al., 1989; Poehlmann et al., 2012); the same is true for attachment research. In this study, we cannot answer if the High Chair assessment is an emotion-inducing assessment, but it is possible. We will leave the question of whether or not the High Chair task is emotion-inducing to future researchers who measure child distress in the High Chair assessment and carefully compare it to the same child distress measure in

other assessments, like free play; the EHSREP did not do the same child distress measurements across High Chair and Three Bag assessments. Our argument based on this study's results, however, is that it may be valuable to include more than just free play situations, like also including the clean-up task, Strange Situation, and, after further research, the High Chair assessment may be considered as well.

#### 4.1. High Chair and child outcomes by ethnic group

High Chair prediction of child outcomes, above and beyond Three Bag predictors, was significant among White families only. Three Bag responsiveness, in contrast, predicted the emotion outcome across White, Black, and Latina/o dyads, and only predicted the cognitive outcome for Black dyads. Three Bag detachment did not predict cognitive outcomes among any ethnic groups, but predicted emotion outcomes among White and Latina/o dyads. An important take home message from this study, however, was that there were no significant differences between ethnic groups in either High Chair or Three Bag prediction of outcomes. Although these results suggest that the High Chair may not be related to child outcomes among low-income, Black and Latina/o families, the apparent differences in prediction when analyzed separately (e.g., High Chair responsiveness is only a significant predictor of White dyads) are not strong enough to be significant differences across ethnic groups. Unlike some previous research (e.g., Halberstadt et al., 2001), we did not find that the relation between parenting practices and child development varied across ethnicities.

Three Bag prediction of outcomes may be significant among ethnic minority groups compared to High Chair's lack of prediction among ethnic minority groups for many different reasons, none of which we can determine post hoc as the definitive cause. We can speculate that one reason could be that the distribution of scores from both the input and output variables may differ by ethnic group, familiarity of situation, coding, or, perhaps, some other cause. Post hoc comparisons showed that Black and Latina/o groups were not significantly different from each other, but were significantly different from the White group, in mean levels of High Chair responsiveness and detachment. Differences in predictors' variances may be a partial explanation for a range of magnitude in prediction of outcomes across groups for the High Chair. Post hoc tests of homogeneity of variance analyses found that the variances of the three ethnic groups were not different from each other for Three Bag responsiveness, but High Chair responsiveness and detachment in addition to Three Bag detachment did have a significant difference in variance across the three groups. One might speculate that High Chair variance would be smaller for ethnic minority groups, given that High Chair prediction of outcomes was nonsignificant for ethnic minority groups. For High Chair responsiveness, there was somewhat more variance in the White than the Black and Latina/o groups. For High Chair detachment, Latina/o dyads had the highest variance, but Black dyads had the lowest. Perhaps, the difference in variance across ethnic groups made some contribution to the range in magnitude of High Chair effects on outcomes across ethnic groups. We cannot, however, claim that variance differences are the accurate or complete explanation. Results suggesting that High Chair prediction was only significant among White dyads might be due to reasons of differential variation unique to this sample, lack of relevance of the High Chair or Three Bag predictors to outcomes for different ethnic groups, or other causes which we cannot determine post hoc. Future studies might consider testing if potential ethnic differences are due to explanatory factors like discrimination, chronic stressful events associated with poverty, and limited maternal educational and work opportunities. These explanatory variables may help paint a fuller picture of parenting, ethnicity, and income beyond a two-dimensional description of ethnic minority parenting and child outcomes.

#### 4.2. Limitations

Both the strength and weakness of the present study is that the sample is living in poverty. The EHS sample is diverse, oversamples different ethnic groups, and has variation in income among those in poverty (Fuligni & Brooks-Gunn, 2013). The poverty of this sample, however, limits our ability to draw conclusions only to those living in poverty. Without a higher income comparison group, it is not possible to determine if these relations were truly unique to those in poverty. For instance, perhaps the relations between the High Chair and child outcomes would be different for middle-income Black families, compared to this study's sample of low-income Black families. Another weakness of this study was that one of two loadings on the 14 month cognitive outcome was low; however, a latent factor can still be adequate in reliability if it includes one low loading and another strong loading (Hancock & Mueller, 2001).

Future studies should also assess reliability in addition to socioemotional and academic outcomes of the High Chair over a longer period of time. We also recommend future longitudinal, cross-lagged analyses which account for reciprocal child effects over multiple assessments (e.g., Lugo-Gil & Tamis-LeMonda, 2008). Finally, some might question whether or not the High Chair is ecologically valid or a naturalistic challenging situation. Perhaps, the High Chair task may be more or less ecologically valid in different ethnic groups. Whereas the High Chair situation is a contrived task involving the observer giving the mother instructions, it mimics situations in daily life in which parents restrain children, such as regular use of a high chair or a car seat. Comfort with child restraint without distracting toys may differ by culture and ethnic group. In addition, the High Chair task may elicit a "white coat" phenomenon in which the powerful role of the examiners, especially as representatives of the EHSREP, may potentially unduly influence participants toward excessive compliance (e.g., mothers ignoring infants while completing a questionnaire which the examiners asked them to complete). Given such concerns, it would be important to debrief research participants after they complete the High Chair assessment. The debriefing process could explain that ignoring infants in high chairs is not recommended.

#### 4.3. Conclusions and implications

The methodological contribution of this study is that the context of parenting is important in predicting child outcomes. Parenting

in a mildly stressful context in the home was predictive of child outcomes, above and beyond parenting in a low stress context. There were no significant ethnic differences in prediction of outcomes. Given the stress faced by families in poverty (Evans & Kim, 2013), it is important that assessments in low-income homes capture the full range of possible situations, including stressful situations, that may be faced by low-income families, and that the cultural relevance of the assessment be given important consideration in model testing.

It is too soon for practitioners to employ the EHS High Chair task as an assessment of parenting in early childhood settings. Use of the High Chair in combination with a free play task in future studies, however, may facilitate understanding of a wide range of parenting and child outcomes. This study holds methodological implications for future studies testing the impact of diverse, low-income infant–parent interactions on children's outcomes across situations.

## Acknowledgements

The findings reported in this paper are based on research conducted as part of the national EHS Research and Evaluation Project funded by the Administration of Children and Families (ACF), U.S. Department of Health and Human Services under contract 105-95-1936 to Mathematica Policy Research, Princeton NJ, and Columbia University's National Center for Children and Families, Teachers College, in conjunction with the EHS Research Consortium. The Consortium consists of representatives from 17 programs participating in the evaluation, 15 local research teams, the evaluation contractors and ACF. The videotapes were coded and analyzed at the National Center for Children and Families, Teachers College, Columbia University. The content of this publication does not necessarily reflect the views or policies of the U.S. Department of Health and Human Services. We thank the mothers and their children who graciously allowed us to videotape their interactions in their homes. And, we deeply appreciate the coding provided by all of our wonderful graduate students at the National Center for Children and Families.

## References

- Ainsworth, M. D. S., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child Development, 41*(1), 49–67.
- Annie E. Casey Foundation (2013). *The first eight years: Giving kids a foundation for lifetime success*. Baltimore, MD: Annie E. Casey Foundation. Retrieved from [www.aecf.org](http://www.aecf.org).
- Authors (1997). *14 month child–parent interaction rating scales for the High Chair assessment*. New York: Teachers College, Columbia University (Unpublished Coding Manual).
- Baumwell, L., Tamis-LeMonda, C. S., & Bornstein, M. H. (1997). Maternal verbal sensitivity and child language comprehension. *Infant Behavior and Development, 20*(2), 247–258.
- Bayley, N. (1993). *Bayley scales of infant development: Manual*. Psychological Corporation.
- Brady-Smith, C., Brooks-Gunn, J., Tamis-LeMonda, C. S., Ispa, J. M., Fuligni, A. S., Chazan-Cohen, R., & Fine, M. A. (2013). Mother–infant interactions in early head start: A person-oriented within-ethnic group approach. *Parenting: Science and Practice, 13*, 27–43.
- Britto, P. R., & Brooks-Gunn, J. (2001). Beyond shared book reading: Dimensions of home literacy and low-income African American preschoolers' skills. *New Directions for Child and Adolescent Development, 92*, 73–90.
- Britto, P. R., Fuligni, A. S., & Brooks-Gunn, J. (2002). Reading, rhymes, and routines: American parents and their young children. In N. Halfon, K. T. McLearn, & M. A. Schuster (Eds.), *Childrearing in America: Challenges facing parents with young children* (pp. 117–145).
- Early child development in the 21st century: Profiles of current research initiatives. In J. Brooks-Gunn, A. S. Fuligni, & L. Berlin (Eds.), New York: Teachers College Press.
- Brooks-Gunn, J., Liaw, F. R., Michael, R. T., & Zamsky, E. S. (1992). *Manual for coding free play parenting styles: From the Newark Observational Study of the Teenage Parent Demonstration*. New York: Teachers College, Columbia University (Unpublished Coding Manual).
- Cabrera, N. J. (2013). Positive development of minority children. *Society for Research in Child Development Social Policy Report, 27*(2), 1–30.
- Caldwell, B. M., & Bradley, R. H. (2003). *Home Observation for Measurement of the Environment: Administration manual*. Tempe, AZ: Family & Human Dynamics Research Institute, Arizona State University.
- Cassidy, J., & Shaver, P. R. (2016). *Handbook of attachment: Theory, research, and clinical applications* (3rd ed.). New York: Guilford Press.
- Evans, G. W., & Kim, P. (2013). Childhood poverty, chronic stress, self-regulation, and coping. *Child Development Perspectives, 7*(1), 43–48.
- Fenson, L., Dale, P. S., Reznick, J. S., Thal, D., Bates, E., Hartung, J. P., ... Reilly, J. S. (1993). *The MacArthur Communicative Development Inventories: User's guide and technical manual*. San Diego: Singular Publishing Group.
- Fenson, L., Dale, P. S., Reznick, J. S., Bates, E., Thal, D. J., Pethick, S. J., ... Stiles, J. (1994). Variability in early communicative development. *Monographs of the Society for Research in Child Development, i*-185.
- Fenson, L., Pethick, S., Renda, C., Cox, J. L., Dale, P. S., & Reznick, J. S. (2000). Short-form versions of the MacArthur Communicative Development Inventories. *Applied Linguistics, 21*, 95–116.
- Fuligni, A. S., & Brooks-Gunn, J. (2013). Mother–child interactions in Early Head Start: Age and ethnic differences in low-income dyads. *Parenting: Science and Practice, 13*(1), 1–26.
- Goldsmith, H. H., & Rothbart, M. K. (1996). *The Laboratory Temperament Assessment Battery*. Madison: University of Wisconsin.
- Halberstadt, A. G., Craig, A. B., Lozada, F. T., & Brown, G. L. (2011). Parents' beliefs, behaviors, and the relationships between them: Differences and similarities by ethnicity and education. In E. M. Leerkes & J. A. Nelson (Chairs), *Racial and Cultural Differences in Parents' Emotion Socialization Beliefs and Practices*. Montreal, Canada: Symposium presented at the meeting of the Society for Research in Child Development.
- Halberstadt, A. G., Denham, S. A., & Dunsmore, J. C. (2001). Affective social competence. *Social Development, 10*(1), 79–119.
- Hancock, G. R., & Mueller, R. O. (2001). Rethinking construct reliability within latent variable systems. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural equation modeling: Present and future – A Festschrift in honor of Karl Jöreskog*. Lincolnwood, IL: Scientific Software International, Inc.
- Structural equation modeling: A second course. In G. R. Hancock, & R. O. Mueller (Eds.), (2nd ed.). Charlotte, NC: Information Age Publishing, Inc.
- Hofferth, S. L., & Sandberg, J. F. (2001). How American children spend their time. *Journal of Marriage and Family, 63*(2), 295–308.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55.
- Ispa, J. M., Fine, M. A., Halgunseth, L. C., Harper, S., Robinson, J., Boyce, L., ... Brady-Smith, C. (2004). Maternal intrusiveness, maternal warmth, and mother–toddler relationship outcomes: Variations across low-income ethnic and acculturation groups. *Child Development, 75*(6), 1613–1631.
- Ispa, J. M., Csizmadia, A., Rudy, D., Fine, M. A., Krull, J. L., Bradley, R. H., & Cabrera, N. (2013). Patterns of maternal directiveness by ethnicity among Early Head Start research participants. *Parenting: Science and Practice, 13*, 58–75.
- Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*(4), 1091–1111.

- Landry, S. H., Smith, K. E., Swank, P. R., Assel, M. A., & Vellet, S. (2001). Does early responsive parenting have a special importance for children's development or is consistency across early childhood necessary? *Developmental Psychology*, 37(3), 387.
- Leigh, P., Nievar, M. A., & Nathans, L. (2011). Maternal sensitivity and language in early childhood: A test of the transactional model. *Perceptual and Motor Skills*, 113(1), 281–299.
- Love, J. M., Kisker, E. E., Ross, C. M., Schochet, P. Z., Brooks-Gunn, J., Paulsell, D., ... Brady-Smith, C. (2002). *Making a difference in the lives of infants and toddlers and their families: The impacts of Early Head Start, Vol. I–III* Washington, D.C: U.S. Department of Health and Human Services (Final technical report).
- What makes a difference: Early Head Start Evaluation findings in a developmental context. J. M. Love, R. Chazan-Cohen, H. Raikes, & J. Brooks-Gunn (Eds.). *Monographs of the Society for Research in Child Development*.
- Lozoff, B., & Brittenham, G. (1979). Infant care: Cache or carry. *Journal of Pediatrics*, 95(3), 478–483.
- Lugo-Gil, J., & Tamis-LeMonda, C. S. (2008). Family resources and parenting quality: Links to children's cognitive development across the first 3 years. *Child Development*, 79(4), 1065–1085.
- Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent–child interaction. In P. H. Mussen (Series Ed.) & E. M. Hetherington (Vol. Ed.), *Handbook of child psychology: Socialization, personality, and social development* (pp. 1–101). New York, NY: Wiley.
- Malatesta, C. Z., Culver, C., Tesman, J. R., Shepard, B., Fogel, A., Reimers, M., & Zivin, G. (1989). The development of emotion expression during the first two years of life. *Monographs of the Society for Research in Child Development*, i-136.
- Martin, J. A. (1981). A longitudinal study of the consequences of early mother–infant interaction: A microanalytic approach. *Monographs of the Society for Research in Child Development*, 46(3, Serial No. 190), 1–58.
- Muthén, L. K., & Muthén, B. O. (1998–2011). *Mplus user's guide*(6th ed.). Los Angeles, CA: Muthén & Muthén.
- NICHD Early Child Care Research Network (1999). Child care and mother–child interaction in the first 3 years of life. *Developmental Psychology*, 35, 1399–1413.
- Ogbu, J. U. (1981). Origins of human competence: A cultural-ecological perspective. *Child Development*, 52, 413–429.
- Poehlmann, J., Hane, A., Burnson, C., Maleck, S., Hamburger, E., & Shah, P. E. (2012). Preterm infants who are prone to distress: Differential effects of parenting on 36-month behavioral and cognitive outcomes. *Journal of Child Psychology and Psychiatry*, 53(10), 1018–1025.
- Raver, C. C. (2004). Placing emotional self-regulation in sociocultural and socioeconomic contexts. *Child Development*, 75(2), 346–353.
- Seidell, J. C., Muller, D. C., Sorkin, J. D., & Andres, J. D. (1992). Fasting respiratory exchange ratio and resting metabolic rate as predictors of weight gain: The Baltimore Longitudinal Study on Aging. *International Journal of Obesity and Related Metabolic Disorders*, 16(9), 667–674.
- Shaw, D. S., Keenan, K., & Vondra, J. I. (1994). Developmental precursors of externalizing behavior: Ages 1 to 3. *Developmental Psychology*, 30, 355–364.
- Shaw, D. S., Winslow, E. B., Owens, E. B., Vondra, J. I., Cohn, J. F., & Bell, R. Q. (1998). The development of early externalizing problems among children from low-income families: A transformational perspective. *Journal of Abnormal Child Psychology*, 26(2), 95–107.
- Sroufe, L. A. (1985). Attachment classification from the perspective of infant–caregiver relationships and infant temperament. *Child Development*, 56(1), 1–14.
- Tamis-LeMonda, C. S., Shannon, J., Cabrera, N., & Lamb, M. (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.
- Tronick, E., Als, H., Adamson, L., Wise, S., & Brazelton, T. B. (1978). Infants response to entrapment between contradictory messages in face-to-face interaction. *Journal of the American Academy of Child and Adolescent Psychiatry*, 17, 1–13.
- The Family Life Project: An epidemiological and developmental study of young children living in poor rural communities. L. Vernon-Feagans, & M. J. Cox (Eds.). *Monographs of the Society for Research in Child Development*.
- Voigt, R. G., Brown, F. R., III, Fraley, J. K., Liorente, A. M., Rozelle, J., Turcich, M., ... Heird, W. C. (2003). Concurrent and predictive validity of the cognitive adaptive test/clinical linguistic and auditory milestone scale (CAT/CLAMS) and the Mental Developmental Index of the Bayley Scales of Infant Development. *Clinical Pediatrics*, 42(5), 427–432.
- Willoughby, M. T., Stifter, C. A., & Gottfredson, N. C. (2015). The epidemiology of observed temperament: Factor structure and demographic group differences. *Infant Behavior And Development*, 39(2), 21–34.