Parent-Infant Interactions in Low-Income Minority Families:

Interplay of Parent Support and Cumulative Risk on Child Outcomes

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Abstract

The present study investigates the influence of multiple types of risk factors and the quality of parent-child interactions on early language outcomes in children from low-income, minority households. 68 infant-parent dyads were assessed at six and twelve months, using various measures of risk factors, quality of parent-child interactions, and early communicative development. Results suggest that both risk profile and parent support predict early language outcomes in low-income, minority children. Furthermore, high quality parent support may serve as a protective buffer against cumulative risk in early child language outcomes, and thus may be a valuable form of intervention. Finally, results suggest that more nuanced tasks such as caretaking or co-viewing media tasks may be less influenced by an observer effect and thus, stronger measures of caregiver sensitivity.
In the first year of life, parents rhythmically respond to their child’s signals and demands, through feeding, soothing, caretaking, and entertaining. As the child comes to rely on the parents’ ability to consistently fulfill his or her needs, a secure attachment is created. Soon, this rhythm becomes a dance, as parent and child become mutually responsive, synchronous partners. As the primary form of socialization, the parent-child relationship acts as a model for the child’s future interactions outside the family. Consequently, it is of no surprise that the quality of parent-child interactions plays a critical role in cognitive, behavioral and socio-emotional development (Collins & Madsen, 2003; Estrada, 1987; Maccoby, 1980). However, the role of both partners in this dance has not always been so seemingly obvious. Prior to the 1960s, the parent-child relationship was considered unidirectional, with research focused on matching parenting variables with child outcomes (Kuczynski, 2003). Such a simplistic conceptualization of parenting ignored the day-to-day interactions and developmental changes that, overtime, translate child-rearing practices into child outcomes. Consequently, numerous process myths arose, deterministically pairing child outcomes with individual parenting traits. Specifically, mothers were found to blame for the vast majority of psychopathologies, while the role of genetics, environment, fathers, and child temperament were neglected (Caplan, 2010).

However, the era of unidirectional research came to an end in the 1960s, with the rise of various new models, including child effects, goodness of fit and relationship systems models (Bell, 1968; Chess, 1963; Rhinegold, 1969). Such models marked the shift to a bidirectional understanding of parent-child interactions as a dynamic relationship actively shaped by the reactions and behaviors of both partners (Cohn &
Tronick, 1987; Symons, 1987).

**Role of high-quality PCI**

Consequently, over the past 50 years, a vast literature on parent-child interactions has developed and repeatedly demonstrated the same finding: this relationship matters. Secure parent-child relationships—marked by mutual responsiveness, support and synchrony—have been found to provide significant developmental advantages (eg., Isabella, 1993; Collins & Madsen, 2003). Caregivers who respond to child initiations, actively participate in reciprocal social interactions, frequently interact verbally, and provide stimulating materials contribute positively to the language outcomes of young children (eg., Caldwell & Bradley, 1984; Clarke-Stewart, 1973; Hart & Risley, 1992; Yoder, Warren, McCathren, & Leew, 1998). Furthermore, mutually responsive parent-child relations in infancy promote higher communicative competence and self-control, facilitating smoother future socialization in school, family and peer relations (Sroufe, Carlson, & Shulman, 1993; Lindsey, Cremeens, Colwell, & Caldera, 2009).

**Impact of low-quality PCI**

Alternatively, less synchronous parent child interactions hamper socialization. Critical to the development of a secure attachment, responsiveness is a crucial hallmark of high-quality, parent-child relationships (Collins & Madsen, 2003). The absence of maternal responsiveness is associated with a variety of negative outcomes, including adolescent behavior problems (Wakschlag & Hans, 1999). The low level of maternal responsiveness frequently observed in postnatal depression has been identified as one of the primary mediators of negative child developmental outcomes associated with maternal depression (Leckman-Westin, 2009; Milgrom, Westley, & Gemmill, 2004).
These outcomes include poor self-regulation, impaired interaction skills, increased risk of psychopathology and future mimicry of this depressed interaction pattern in later relationships (Cummings, 1994; Field, 1995; Milgrom et al., 2004).

**Cognitive Outcomes of Low-Quality PCI**

The quality of parent-child interactions in the first years of life also plays a significant role in long-term cognitive development. One of the most powerful illustrations of this comes in Hart and Risley’s landmark work, *Meaningful Differences in the Everyday Experience of Young American Children* (1995). Through two and a half years of monthly home observations, Hart and Risley documented in-depth snapshots of the everyday lives of forty-two young children from a full-spectrum of demographic backgrounds. Their findings revealed massive differences in the amount of parent talk between households, as the number of words spoken to the child on average in any given hour ranged from 500 to 3,000 (Hart & Risley, 1995). As amount of parent talk was found to be consistent within each family, researchers extrapolated these findings to predict that by age four, some children hear over 50 million words addressed to them by their parents, while others hear only 10 million words (Hart & Risley, 1995). These vast differences were predictive of child outcomes of vocabulary size, verbal sophistication, IQ scores at age three and expressive language use, as children’s talkativeness was found to stop growing once it matched that of their parents (Hart & Risley, 1995; 1999.)

Furthermore, Hart and Risley (1992, 1995) discovered that interaction types fell into one of two broad categories: business talk or positive talk. Business talk, involving intentional interactions used to clearly communicate and direct a child’s behavior (e.g., stop it; get down; put your shoes on), is similar across households regardless of SES. Conversely,
positive talk responsively extends a child’s individual interactions by increasing the number of turns in any one set of interactions. This talk is highly variable across families, more characteristic of educated parents’ interactions, and similar to an intricate dance between parents and their children (Hart & Risley, 1999). Consequently, the impacts of this ‘extra’ talk, which is correlated with higher SES status, add up overtime (Hart & Risley, 1995). In fact, the “amount of parent talk accounted for all correlation between socioeconomic status (and/or race) and the verbal intellectual accomplishments of these 42 young American children” (Risley & Hart, 2006).

**Early risks to PCI associated with poverty**

Less and lower-quality linguistic input is only one of many risks that are directly and indirectly linked to living in economically disadvantaged circumstances. Other risks LSES preschoolers face include: fewer and lower quality, cognitively-stimulating activities and materials; fewer informal learning opportunities; erratic or inattentive parenting; exposure to high levels of environmental noise, especially noise generated by a television left on most or all day; and sub-standard housing in neighborhoods where achievement levels are low and safety risks are high (Farah, 2008).

Furthermore, LSES preschoolers and families from culturally or linguistically diverse backgrounds experience additional disadvantages that can amplify the already-considerable impacts attributable to poverty (Takanishi, 2004). This is significant as minority children comprise a disproportionate share of the low-income population, with 66% of Latino and 70% of African American children under age six live in LSES families compared with 35% of White children (Wight, 2010).
Poor developmental outcomes are further exacerbated when children experience poverty earlier in life or for longer periods of time (Shonkoff & Phillips, 2000). Early and chronic environmental deprivation, a primary characteristic of LSES children’s everyday experiences, negatively influence the mechanisms responsible for developmental growth in executive function and school readiness abilities (Hart & Risley, 1995; Kishiyama, 2009; Shonkoff & Phillips, 2000; Walker et al., 1994). Research documents risk-related deficits in cognitive and academic skills (Duncan, 1994; Korenman, Miller, & Sjaastad, 1995) language abilities (Hart & Risley, 1995; Walker, 1994), and attentional and behavioral regulation (McLeod & Shanahan. These early developmental gaps are persistent, resistant to intervention, and widen as infants mature and transition into preschool and formal schooling (i.e., Matthew effect; Stanovich, 1986). As such, these early disparities are linked to repeating grades, experiencing emotional distress, needing special education services, and dropping out of school (Ackerman, Izard, Kobak, Brown, & Smith, 2007; Walker et al., 1994).

Furthermore, as risks due to poverty accumulate, deficits in developmental outcomes increase in both prevalence (i.e., across domains) and size. Allostasis theory suggests that chronic exposure to environmental stressors overtaxes the neuroendocrine response, which can cause the dysregulation of multiple interrelated physiological systems (McEwen, 2002). Measures of allostatic load have been found to predict a variety of poor health outcomes (Glei, Goldman, Chuang & Weinstein, 2007), as well as children’s elevated behavioral problems and impaired executive control (Ackerman, Schoff, Levinson, Youngstrom, & Izard, 1999; Li-Grining, 2007).
The present study

The purpose of the present study is to investigate the influence of multiple types of risk factors and the quality of parent-child interactions on early language outcomes in children from low-income, minority households. As discussed above, low-income minority children face cumulative risk factors, including, but not limited to, higher risk for maternal depression (Vericker et al., 2010), decreased vocabulary exposure (Hart & Risley, 1995), increased rates of media exposure (Zimmerman et al., 2007), poorer parental education and higher parenting stress levels (Abidin, 1995). Expressive communication development was chosen as the child outcome to be assessed, as this is a critical skill that shapes how children learn and interact with others (Walker, Greenwood, Hart, & Carta, 1994). Furthermore, delays in early expressive communication can lead to further developmental delays, as well as impede literacy and school achievement (Paul, 2011).

The present study employs a combination of self and observer-reported measures to assess the presence and magnitude of psychosocial and sociodemographic risk factors in the infant’s day-to-day life, a direct measure of the quality of parent-child interaction when infants are 6 and 12 months, and a direct measure of early communicative development at 6 and 12 months.

Everyday parent-child interactions in general and around media significantly impact child development. Hence, the Individual Growth and Development Indicators for Infants and Children (IGDI) IPCI was used to evaluate the quality of such interactions in the context of everyday activities. The Indicator of Parent-Child Interaction (IPCI) was chosen because it was developed as a measure of the sensitivity and responsiveness of
caregivers of children ages 2 to 42 months (Carta, Greenwood, Walker, & Buzhardt, 2010). The IPCI is designed specifically for practitioners aiming to support caregivers in fostering positive socio-emotional development in young children. As such, the IPCI can be used to monitor children’s exposure to the types of nurturing interactions with caregivers that are known to promote positive socio-emotional behavior. Furthermore, this measurement may subsequently be used to determine whether or not an individual child is receiving a comparable amount of nurturing interactions to other children his/her age (Carta et al., 2010).

Moreover, the IPCI measure is collected in a naturalistic home setting, can be collected efficiently and economically, is standardizable and replicable, can be reliably administered, and is sensitive to known differences in various at-risk populations of parents and children (Carta et al., 2010). The duration and relatively informal set-up make it easy to reliably train researchers to implement and easy to administer in a home or childcare setting. Thus, the present study examines whether early parent-child interaction quality as indexed by the IPCI is associated with poverty-related stressors in low-income, minority families, and how this association relates to early child language outcomes. I hypothesize that high levels of parental support in early development will ameliorate some risk factors associated with growing up in poverty and predict early language outcomes.

**Method**

The present study is part of a larger longitudinal, intervention study aimed at reducing background media in low-income, minority homes. The intervention aspect of the study will not be discussed further.
Participants

138 infants and families were recruited into the study on a rolling basis (i.e., about 20 families per month split equally by site and gender) when infants were 6 months of age. They were recruited through a combination of flyers, radio commercials, community centers, Women and Children (WIC) clinics and word of mouth. Prior to enrollment, participants were screened for low socioeconomic status (LSES) defined as annual income that is no more than 185% of the federal poverty threshold (FPT). For example, for a family of four, the poverty line was an annual income of $21,000 and the family could earn no more than $38,850. Participating parents must be at least 18 years of age for consent purposes and must be willing to allow their child to watch screen media starting as early as 6 months and to use a computer at 2 years. Samples were drawn from low-income areas in Philadelphia, PA, and Washington, DC. Based on the targeted areas, the Philadelphia sample was primarily LSES, African American and the Washington, DC sample was primarily LSES, low English proficient (LEP) Hispanics. Of those 138 families, 121 participated at the 6-month time point. A subset of 68 dyads also participated at 12 months. The sample size between measures is not consistent due to technical errors in the video recording of certain tasks. The present study is limited to the 68 dyads that participated longitudinally.

Exclusion criteria. In addition to the income requirements, infants were ineligible if they were diagnosed with or have a significant predisposition for certain low-incidence disabilities resulting from extreme pre-maturity (at least 8 weeks early), hemorrhagic disease, fetal alcohol exposure, or chromosomal abnormalities (e.g., Down Syndrome). The characteristics of media, the demands of our measures, and the size of
the sample require us to limit enrollment to infants without any known visual or hearing impairments. Infants with speech or language delays, learning disabilities, and other high-incidence disabilities were not excluded.

**Participant demographics.** At the 6-month time point, participants were 121 children ($M_{age} = 6$ months 15 days, $SD = 22$ days; 60 males and 61 females) and their primary caregivers (2 were not mothers; $M_{age} = 26$ years, $SD = 6$ years). The dyads lived in Philadelphia (n=82) and Washington DC (n=39). Primary caregivers were African-American ($n = 93$) and Latino ($n = 28$) and 52 were married or had a live-in partner. Monthly household income was calculated ($M = $1753, $SD = $1309). Primary language spoken in the household was English ($n = 93$), Spanish ($n = 25$), bilingual (English/Spanish; n=2) and unreported ($n = 1$). For missing socioeconomic status values, mean values (calculated by location) were imputed.

Of these 121 participants, 68 participated at 12 months and will be referred to as the “longitudinal sample.” At the 12-month time point, participants were 68 children ($M_{age} = 6$ months 15 days, $SD = 22$ days; 31 males and 37 females) and their primary caregivers (2 were not mothers; $M_{age} = 26$ years, $SD = 6$ years). The dyads lived in Philadelphia (n=34) and Washington DC (n=34). Primary caregivers were African-American ($n = 44$) and Latino ($n = 24$) and 30 were married or had a live-in partner. Monthly household income was calculated ($M = $1753, $SD = $1309). Primary language spoken in the household was English ($n = 43$), Spanish ($n = 24$), bilingual (English/Spanish; n=2) and unreported ($n = 1$).
Measures

Media exposure.

*Time use diary.* A Time Use Diary was used to capture a typical daily experience for the infant. Collected biannually via telephone interview, parents were asked to report on a recent typical day (usually the day before). Parents were ‘walked’ through 24-hours and asked to list each activity and its length. When activities were media-related, follow-up questions included media name/title/URL; viewed live, by DVD, or on demand; where and with whom; and whether background TV or music was on during non-media activities. Time use diaries have several advantages: 1) all activities are listed so displacement of one activity for another can be measured; 2) it is difficult to self-present as light media users since other activities must be described instead; and 3) detailed content and use information is collected (Vandewater & Lee, 2009). Limitations include an inability to capture low frequency events; daily activities that take little time (e.g., washing hands); recording more than two events simultaneously; and forgetting. Diaries are validated against direct observation with correlations ranging from .70-.80 (Anderson, Field, Collins, Lorch, & Nathan, 1985).

**Sociodemographic Risk**

*The Home Observation for Measurement of the Environment.* (HOME; (Caldwell & Bradley, 1984). This was designed to measure the quality and quantity of stimulation and support available to a child in the home through a 45-90 minute visit when the parent and child are home and awake. Collected at the six-moth visit, this measure focuses on the child in the environment as a recipient of inputs from objects, events, and transactions occurring in connection with the family surroundings including
parental responsivity, acceptance of child, organization of the environment, learning materials, parental involvement, and variety in experience. A binary-choice (yes/no) format is used in scoring items. The alpha coefficients for the total scores are all above .90. This 45-item measure contains questions that pertain to the following categories: parental responsivity, acceptance of child, organization of the environment, learning materials, parental involvement, and variety in experience. Below are examples of the item definitions for the IT HOME form. As mentioned above, a binary-choice format for “no” or for “no opportunity”, and for “yes” was used to score the items. Specific examples of questions from the IT HOME are included in Appendix A.

**Psychosocial Risk**

*Center for Epidemiologic Studies Depression (CES-D).* Caregiver depression was assessed at six months using the CES-D, a 20-item self-report depression questionnaire for the past week with a three-point scale per item. The items of the scale are symptoms associated with depression that have been used in previously validated longer scales. Reliability, validity, and factor structure were similar across a wide variety of demographic characteristics in the general population samples tested (Radloff, 1977).

**Parent Child Interaction Measure**

*IGDI-Indicator of Parent-Child Interaction* (Baggett & Carta, 2006) Interactions were videotaped in the home every 6 months during media use, free play, book reading and personal care routines (e.g., dressing). Parents were instructed to interact with their child as they normally would in these contexts. Inter-observer reliabilities for the four domains of the IPCI were reported to be: .83 for child engagement, .84 for caregiver facilitators, .86 for caregiver interrupters and .99 for child distress (Carta et al., 2010).
Child Outcomes

IGDI-Early Communication Indicator The IGDI-ECI was developed as a measure of growth in the expressive communication of children from 3 months to 3 years old (Luze, Linebarger, Greenwood, Carta, Walker, Leitschuh & Atwater, 2001). As some language difficulties in children are often not diagnosed until preschool (Wetherby & Prizant, 1992, as cited in Luze et al., 2001), the ECI was developed as a means of earlier evaluation that could allow for earlier intervention services. The ECI was conducted at 6 and 12 months to track the typical trajectory of infant language expression, measuring the use of gestures, sounds, words, or sentences to convey wants and needs or to express meaning to others. Moreover, the ECI measure is collected in a naturalistic play context, and can be collected efficiently and economically, is standardizable and replicable, assesses key skill elements of expressive communication, is technically adequate, and sensitive to growth and change over time and to the effects of interventions (Luze et al., 2001). Reliability with the PLS-3 and a caregiver report yielded correlations of .75 or higher. The ECI is sensitive to growth, intervention, and disability status. Overall inter-observer reliability was reported to be .90 (Luze et al., 2001).

Procedure

At six months, there were four scheduled sessions. The first two visits occurred in the home. The third visit was a phone time used to collect the time use diary. The final visit took place in the laboratory. Sessions one, two, and four were scheduled at a time of day designated by parents as one when their child is active and alert. In session one informed consent, demographic information, and IT HOME were conducted. In session two, researchers conducted the IGDI- IPCI and ECI. In session four, researchers
administered an auditory-visual habituation task which will not be discussed further. As the families predominantly spoke either Spanish or English, researchers bilingual in English and Spanish conducted the visits and coded the videos. Two researchers collected the data on sessions one, two, and four.

At 12-months of age, there was one home visit and a scheduled one hour time use phone. In this home visit, the IGDI-IPCI and ECI were conducted.

**Demographic information collection.** A self-report of family information was collected every six months. Parents were asked detailed information about parent demographics (e.g., education, income, race, family, housing, languages) and the child’s birth (e.g., prematurity, birth weight / height). The parent filled out the CESD-20 and media use surveys. The researcher let the caregiver know that he/she was available to clarify any questions pertaining to completion of the surveys. Demographic information including primary caregiver (PC) socio-economic status (SES), PC language, PC education, PC parenting stress, PC depression and household chaos (including independent measures of household density and media use patterns) were collected at 6 months. PC depression, household chaos were collected again at 12 months, in addition to a parent interview follow-up which asks about any changes in demographic information including marital status, employment, income, household make-up, etc.

**IT HOME procedure.** On the first six-month one visit, the researchers visited the family’s home to learn about the child’s world. The answers to items on this form can be observed and/or parent reported and as such, an interview with the parent was conducted by the primary researcher, while simultaneous observations of the immediate and visible rooms of the home and of the parent-child interaction were done by the secondary
researcher. The secondary researcher was also paying attention to the interview and filling out the items that were answered. Researchers asked follow-up questions to any items that were not observed or reported during the interview.

**IGDI-PCI Procedure.** Interactions were videotaped in the home every 6 months during media use, free play, book reading and personal care routines (e.g., dressing). Parents were instructed to interact with their child as they normally would in these contexts. Free play was recorded for five minutes, during which the researcher provided no outside toys as families were to play however they normally would. However, in recognition that all families may not own books, a standard set of age-appropriate books were provided for the book reading task. Caregivers were instructed to interact with the book however they wished for five minutes. The same books were provided to both English and Spanish-speaking participants, in their respective languages. For dressing, caregivers were asked to change the child’s clothes or simply undress and redress the child. This task was recorded for as long as necessary, up to five minutes. Finally, for the co-viewing media task, a five-minute clip of *Sesame Beginnings* and a second five-minute clip of *Baby Mozart* were screened. These programs were shown on the families own media device. If the family did not own a functioning DVD player or computer, the clips were shown on researcher-provided portable DVD players.

**IGDI-ECI Procedure.** The ECI was conducted in the 6 and 12-month home-visits using a play-based format. For a 6-minute period, the researcher elicited interactions from the child while playing with Fisher Price Little People Animal Sounds Farm, Little People Home Sweet Home and a rattle for six minutes. This interaction is videotaped and later assessed to measure the frequency of child gestures, vocalizations,
single word utterances and multiple word utterances. IGDI-ECI coding definitions are provided in Appendix B.

**Video setup.** The caregiver playing with the infant wore a wireless microphone. The camera was set up in such a way that both caregiver and infant, and the toys that were being played with were in the frame at all times and that facial expressions were captured as frequently as possible. A VideoSlate form containing the Test Period (6mo2), Measure (ECI/IPCI), Family ID, and administration date was held directly in front of the camera (filling the frame) as the ‘record’ button is pressed which created a label for the video that was to be taken. A thumbnail associated with the file was created to allow for correct identification, filing, and coding later on.

**Results**

**Coding**

**IPCI**

The IPCI coding scheme consists of 14 items broken into four domains: caregiver facilitators, caregiver interrupters, child engagement, and child distress. The elements of each domain represent behaviors that have commonly and consistently been associated with child outcomes in the research literature (Carta et al., 2010). The caregiver facilitator’s domain includes five behaviors consistently associated with ‘facilitating’ positive child socio-emotional development, including: conveys acceptance and warmth, uses descriptive language, follows child’s lead, maintains and extends child’s interest, and uses stress-reducing strategies (Boom, 1994; Landry, Smith, Swank, Assel, & Vellet, 2001; Landry, 2008). The parent interrupter domain includes three behaviors associated with poor child outcomes, including the use of harsh, critical behavior, use of intrusions
and restrictions and rejecting the child’s bid for attention or support (Appleyard, 2005; Chang, 2003). The child engagement domain includes: positive feedback, sustained engagement, and follow through. Finally, the child distress domain included three behaviors associated with later socio-emotional and behavioral problems, including: irritability and fussiness, externalizing behaviors such as aggression or a tantrum, and internalizing behaviors marked by a frozen, withdrawn or watchful character (Carta et al., 2010).

Using IGDI growth metrics, these interactions were then coded by frequency, receiving a 0 if the behavior was never observed, 1 for rarely observed, 2 for sometimes and 3 for always. Scores of non-applicable were given when the parent or child did not have the opportunity to demonstrate the behavior, such as a parent with a content child who did not have the opportunity to soothe and reduce stress. We then created a parental support variable based on the average scores of acceptance and warmth toward child, use of descriptive language, efforts to follow child’s lead, ability to maintain and extend child’s focus and the soothing and reduction of stress. A child engagement variable was created based on average scores of positive feedback toward parent and extent to which child follows through on parental commands. Table 1 details the breakdown of these codes.

Parent interrupters and child distress behaviors were observed with such infrequency that the average scores were limited to positive behaviors. Averages were calculated for both parent and child for each of the five activities at both time points. An overall average was calculated for parent and child at both the 6 and 12-month time point. Due to the frequency of non-applicable scores, we employed averages rather than
composite scores to ensure only items scored would enter into the calculations and parents/children were not given lower scores simply because they did not have the opportunity to display a specific behavior.

Inter-rater reliability was calculated for the IPCI composite scores. 28 percent of all of the sessions at 6 and 12 months were rescored by a second coder and kappa was calculated. Interrater agreement on parent composite (k\textsubscript{parent} = .78) and child composite (k\textsubscript{child} = .73) was strong.

**ECI**

For the purposes of scoring, there is no phase distinction and the categories are: gestures, vocalizations, single word utterances, and multiple word utterances. Based on the following scoring definitions, instances of each category were totaled at both time the 6 and 12-month time point.

**Gestures** are defined as a physical movement made by the infant in an attempt to communicate with the partner. An episode ends when there is a clear and distinct change in infant's movement, such as giving or showing an object.

**Vocalizations** are defined as a non-word or unintelligible verbal utterance voiced by the infant to a partner. Utterances that are coded as vocalizations are those that cannot be understood as single- or multiple words. An utterance ends when there has been a clear break of at least one second without vocalizations (count to yourself: "one thousand one") or a breath.

**Single-Word Utterances** are defined as a single word voiced by the infant that is understood. Each single word utterance is given a weight of two (each tally is multiplied by two).
Multiple-Word Utterances are defined as a combination of two or more different words voiced by the infant that are understood. In this case, an utterance consists of a sentence or multiple words that go together. Each multiple-word utterance is given a weight of three (each one is multiplied by three). Words should approximate a phrase or sentence, e.g. “big truck”.

Cumulative Risk Models

Based on the theories of allostasis and cumulative risk, a model was created in order to calculate cumulative risk for each child. As statistical interactions lack the power to account for proximate and distal stressors, researchers have employed cumulative risk models to replicate the layering of risk factors that generally impact children from low-income households (Evans, 2003; Li-Grining, 2007). Risk is characterized as a dichotomous variable, with the presence of risk coded as 1 and the absence of risk coded as 0. A cumulative risk score was calculated from the sum of all risk factors examined for each child. Risk presence was determined by caregiver responses on the demographic interview, CESD, and time use diary, as well as researcher-scored IT-HOME.

Risk factors examined included psychosocial, sociodemographic and residential risk factors. Psychosocial risks included a score greater than 16 on the depression subscale used. Sociodemographic risk factors included young maternal age (i.e. less than 21 years; (Deater–Deckard, Dodge, Bates & Pettit, 1998), single parenthood (i.e. mothers who are not married or cohabitating; (Deater-Deckard et al., 1998), and low caregiver education (i.e. less than 12 years; (Ackerman et al., 1999). Residential risk factors included living with four or more minors (Ackerman et al., 1999), living with only one adult, low quality and quantity of child stimulation in the home (i.e. Total IT Home score
less than 35 as determined by a median split), and high levels of media exposure (i.e. Media Total Exposure greater than 5 hours/ day).

Results

Parent Child Interaction Quality

The first goal of the study was to examine the role of both parent and child as partners in everyday interactions. To assess this, first-order correlations were conducted. As seen in Table 2, parent support and child engagement at 6 months were significantly associated with their respective scores at 12 months, suggesting a high level of continuity in parenting style and child response across time. Furthermore, parent support scores at 6 months were significantly correlated with child engagement scores at both 6 months and 12 months. As expected, parent support at 6 months was more highly correlated with child engagement at 6 months while parent support at 12 months showed greater correlation with child engagement at 12 months.

Cumulative Risk Model

The second goal of the study was to determine the interaction between various types of risk and the quality of PCI. Consequently, we ran cluster analyses to determine if there were different risk profiles within our population. Cluster analysis by risk factor presence resulted in a three-cluster model. We named Cluster 1 (n=27), which was entirely African American with a primary caregiver over 21 years, Older African American. Cluster 2 (n=22), which was predominately African American with primary caregivers all under age 21, we named Younger African American. Finally, Cluster 3 (n=19), which was entirely Latino with a primary caregiver over 21 years, we named Latino. As seen in Table 3, these three clusters displayed unique patterns of risk.
Task-Related Differences

Once these three risk profiles emerged, we examined whether there were any task-related differences that vary by risk profile across time. Repeated measures ANOVAS were conducted but for this study, only means will be reported. As seen in Figure 1, parent support improved among all three risk profiles from 6 to 12 months. However, this improvement varies by task and risk profile (see Figures 1-5). All three groups improved in a fairly consistent fashion in the free play and co-viewing Baby Mozart tasks. However, in book reading, dress and co-viewing Sesame Beginnings, only the older African-American cluster showed improvement across time in parent support. However, overall, the Latino group had high levels of parent support at 6 months that remained high, while the young African American mothers showed low levels of support that remained low.

Child Outcomes

The third goal of the study was to examine whether risk factors and the quality of PCI predict child language outcomes at 12 months. We examined this by first running a correlation of parent support at 6 months with child language outcomes as measured by the ECI at 12 months. As seen in Table 4, two significant correlations were found between a) parent support at six months and utterance of single words at 12 months and b) parent support at 12 months and multiple words at 12 months.

We then conducted a logistic regression to determine whether or not 12 month olds produced single word utterances during the ECI test and how this varied as a function of risk profile and parent support at 6 months. The model explained between 13
and 20% of the variance using the Cox and Snell Nagelkerke estimates respectively. As seen in Table 5, children of mothers in the older African American risk cluster were 4 times more likely than children of the Latino cluster to display single word utterances at 12 months. There was no difference between younger African American and older Latino mothers. Furthermore, for every unit the parent’s support total at 6 months increased, his or her child was 4.7 times more likely to produce single word utterances at 12 months. That is, parent supportive engagement at 6 months predicted single word usage at 12 months.

**Discussion**

This study examined whether early parent-child interaction quality is associated with poverty-related stressors in low-income, minority families, and how this association relates to early child language outcomes. This research aim was broken down into four questions during data analysis.

**Parent-Child Interaction Quality**

The first question asked was: are parent support and child engagement related? This study employed a direct measure of the quality of parent-child interaction when infants were 6 and 12 months of age. Parental support and child engagement were highly correlated with one another at 6 and 12 months respectively, and between the two time points. Parents and children were most highly correlated within a single time point as these scores represented a single, shared interaction. These findings support the bidirectional understanding of the parent-child interaction as a dynamic relationship.
actively shaped by both partners, both in the moment and overtime (Cohn & Tronick, 1987; Symons, 1987).

**Patterns of Cumulative Risk**

In order to analyze the impact of cumulative risk, we first wished to better understand the stressors our population faced. Thus, the second question asked was: Do these 68 infants, from LSES homes, share the same cumulative risks? This study used a combination of self and observer-reported measures to assess the presence and magnitude of psychosocial and sociodemographic risk factors in the infants’ day-to-day lives. Using a cluster analysis, three unique risk profiles emerged, suggesting that while all of the children had high levels of cumulative risk, these consisted of different risk factors, which may vary their individual outcomes.

The first risk profile to emerge were children of older, African American women, the majority of whom graduated from high school were married or cohabitating and had only one or two children. This cluster had relatively high-quality home environments but large amounts of total media exposure, averaging over nine hours per day. The second risk cluster consisted of children of young, African American women, who predominantly were single-mothers just shy of high school graduation. While these mothers were unwed and not-cohabitating with a partner, they typically lived with others, generally other female kin such as mothers, grandmothers and aunts. Children in this cluster were also exposed to significantly high levels of media, averaging almost nine hours per day. The third cluster to emerge were children of Latinos, whose mothers were older, married or cohabitating and, on average, only completed two years of high school.
Children in this risk profile had mothers with the highest depression scores of all three groups and the lowest quality of in-home stimulation, but had significantly lower levels of total media exposure than the other two clusters, averaging around five hours per day.

The emergence of these unique risk profiles supports the theory that the risks children living in poverty face may vary by race/ethnicity due to varied social and cultural norms and practices within these groups. Furthermore, specific risk factors tend to predict unique specific risk profiles, as evidenced by the two African American risk clusters differentiated by maternal age. Children of African American women under the age of 21 faced greater levels of cumulative risk than those of older African American women, supporting the understanding of young motherhood as encapsulating multiple challenges (Deater-Deckard et al., 1998). Furthermore, while the model employed in this study and others to calculate cumulative risk weights individual stressors equally, this is a strongly simplified illustration of the constellation of cumulative risks that layer upon the lives of children in poverty. As illustrated in the risk profiles in this study, risks are intricately interwoven and may be strongly shaped by maternal age and ethnicity.

**Task Differences in Parent Support by Risk Profile**

The third question asked was: does parent support vary between tasks as a function of risk profile? For all three groups, the highest parent support was seen in play and book reading, with improvement seen in all three clusters across time. These findings contributed to the hypothesis that these two tasks are, which are standard to almost all parent-child interaction measures, may not in fact be the strongest choice of structured activity for naturalistic ratings of PCI. As these two tasks are extremely straightforward,
the majority of parents know what they “should” do during these respective tasks. Thus, the influence of the observer effect may be much greater in these two tasks as opposed to the more nuanced dress and co-viewing media tasks.

While all three groups provided comparatively higher levels of parent support and trend towards a slight improvement over time in free play and book reading, greater between-group differences emerged in the other three tasks. In dress specifically, older African Americans improved across time while Latinos provided consistently high parental support and younger African Americans, consistently low parental support. Through observation, these differences seem to come from strikingly different approaches to dress. As dressing or diaper changing upsets most infants, African American mothers tried to rush through this task as quickly as possible, not stopping to soothe the child until the task was complete. This sharply contrasted with Latino mothers, who tended to spend much longer on this task, stopping to be affectionate, label body parts and/or clothing, and soothe their child if upset. This difference may have been an artifact of an observer effect, if African American and Latino mothers react differently to the potential stress of their child becoming upset in front of the researcher. However, the comparative nuances of dressing as opposed to book reading or free play may make this a stronger task within which to observe parental sensitivity to the child’s needs.

Furthermore, as care routines such as changing, feeding and bathing make up a significant portion of parent-child interactions in the first year of life, the quality of these interactions is significant and merit observation.

Two types of media were included in the study because, while both are designed for infants, they are substantively quite different. Aimed at encouraging high-quality
parent-child interactions. *Sesame Beginnings* models such interactions in Sesame Street characters and human, parent-child dyads. This contrasts with Baby Mozart, which aims to promote labeling by displaying a variety of objects and colors moving to music. As such, parent support by risk profile varied while co-viewing these two types of media. The higher parent support seen in the Latino cluster while co-viewing *Baby Mozart* may be attributable to a cultural difference in the response of parents to researcher requests. After being asked to watch the media with their child, older and younger African American parents appeared to put greater focus on ensuring their child’s attention was directed toward the video. This sharply contrasted with the majority of Latino parents who focused more on following their child’s interest, whether it be in the video or not.

Furthermore, only the older African American group demonstrated increased levels of parent support while co-viewing *Sesame Beginnings*. This may result from the nature of the video, which promotes higher-order parent child interactions, such as relating the activities on the screen to the child’s everyday life. This contrasts strongly with *Baby Mozart*, which primarily promotes simple labeling, a lower-order parent child interaction. As such, the younger African American cohort, who globally provides lower levels of parent support, may be better able to respond to the simple labeling cues, thus increasing their scores for the *Baby Mozart* task. Furthermore, the slightly lower levels of parent support seen in Latinos in *Sesame Beginnings*, may result from problems with comprehension, as this film involves speaking and singing in English, which many of the Latino mothers do not speak.
PCI Quality and Early Language Development

Before examining the interaction of PCI and cumulative risk factors on child outcomes, we examined PCI alone. Thus, the fourth question asked was: Does parent support and child engagement at 6 and 12 months predict child language outcomes at 12 months? To answer this question, the study employed an observer-based rating of child’s communicative language. Parent support at 6 months was significantly correlated with single word utterances at 12 months, as every unit of increase on parental support scores at 6 months made the child 4.7 times more likely to produce single words at 12 months. Thus, this study may replicate the findings of Hart & Risley (1995) that the quality of everyday interactions in early childhood impact early language development. Generally, infants gradually begin to communicate through single word utterances between 12-18 months (Hart & Risley, 1992). While the lack of single word utterances is developmentally typical, those children who are verbally precocious may be at an advantage. For example, such early verbal ability is a better predictor of reading achievement after Grade 4 than the early reading skills of both precocious (Mills & Jackson, 1990) and nonprecocious (Curtis, 1980) readers.

Cumulative Risk, Parent Support and Early Language Development

Finally, the fifth question asked was overarching: how do multiple types of risk factors and the quality of parent-child interactions predict early language outcomes in children from low-income, minority households? The results suggest that both cumulative risk profile and parent support predict early language outcomes in low-income, minority children. Specifically, higher levels of cumulative risk may be
associated with poorer early child language outcomes in this population, supporting the theory that *allostasis* due to prolonged environmental stressors may impair development (McEwen, 2002).

Furthermore, high quality parent support may serve as a protective buffer against cumulative risk, as supported by the similar language outcomes of children in the younger, African American and older, Latino cohorts. Although the younger, African American mothers were unmarried, the vast majority of these women lived with female kin, including mothers and grandmothers who shared in the care-taking responsibilities. Thus, these young, African American mothers may have stronger support systems than the older, Latino mothers who had often emigrated from other countries, leaving their established social support systems behind. In addition, Latino mothers had the least education, most children and highest depression scores. Nevertheless, their children may be buffered against these risks by the higher levels of parent support they receive. Such findings suggest interventions aimed at increasing the quality of parent-child interactions in high-risk homes may serve to protect children against the negative developmental outcomes associated with their environments’.

**Limitations**

This study was limited to a small sample of individuals from minority populations in two American cities and, consequently, cannot be generalized upon these minority groups as a whole. A limitation in the IT-HOME parent form is the binary choice format in which 1 is selected for “yes” and 0 is selected for “no” or “no opportunity”. With “no” and “no opportunity” having the same value, this skews the total score; it would be more
valid to assign distinct values to separate “no” from “no opportunity”. Furthermore, the ECI is a measure of the growth in children’s expressive communication, but only the 6 and 12-month time points were reported in this study. Finally, the Sesame Beginnings video used in the IPCI measure is an English video. Consequently, many of the Latino mothers who do not speak English may have been significantly disadvantaged in this task due to the language barrier.

**Future Directions**

As previously mentioned, the IGDI-IPCI and ECI are good indicators of growth (Luze et al., 2001). The data for the present study was collected as part of an ongoing longitudinal study on the effects of early media exposure from 6 to 24 months of age. At nine months of age, the families were randomly assigned to one of three groups: Content Only (CO), Content + Context (CT), or Control. At the nine-month visit point, the Content group received high-quality age-appropriate educational media and instructions on the importance of reducing background TV exposure. The Content + Context group received the same high-quality, age-appropriate educational media as well as training on how to use media effectively with their children, focusing on developing high-quality, parent-child interactions around media. At nine months, the Control group were not given any specific instructions about how to use electronic media to foster development, only receiving a visit during which language use in the home is sampled to equate for time in the home. The findings of the present study show that parent support at six months is associated with single-word usage at twelve months. However, it can be predicted that over time and with the differences in interventions, the CT group which receives child-directed media and parent-training on how to interact with the child and
that media might have better PCI and ECI scores than the CO and control groups. Data analysis from the 18 and 24-month assessments is currently underway. Intervention group, primary caregiver and home characteristics will also be entered into the developmental model of analysis. As the present study is part of a larger investigation, the next step would be to look at the longitudinal data. Completing the coding of the 18 and 24-month ECI and PCI videos would allow for a comparison of scores from 6 to 24 months, thus showing growth in the child’s expressive communication ability as a function of parent-child interaction quality and risk profile.

Future research should aim to examine this question on a larger and more varied sample, in order to produce more generalizable results. If future research maintains that high levels of parent support can serve as a protective buffer for at-risk children, subsequent research should aim to identify the strongest intervention programs for promoting high-quality parenting in vulnerable populations.

Additionally, measures of caregiver support, which are often administered through semi-structured free play or book reading, should consider more nuanced activities, such as dressing, as possibly less susceptible to the observer effect and stronger tests of caregiver sensitivity.

**Conclusion**

The present study suggest high levels of parent support may serve as a protective buffer against the developmental risks associated with high levels of cumulative risk in low-income, minority children. While many of the cumulative risks children living in poverty face, are beyond the reach of intervention, the quality of parent-child interactions
may be comparatively malleable through strong intervention. As such, understanding the influence of high quality parent-child interactions on the outcomes of at-risk children is critical to better understanding how to help these vulnerable individuals.
References


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Wight, V. R. (2010). *Who are America's poor children?: The official story*


Table 1
*Parent-Child Interaction Quality Behaviors*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Target Behaviors</th>
<th>Item Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Support</td>
<td>Conveys Acceptance and Warmth</td>
<td>Smiling at child, making positive comment to or about child, providing gentle affectionate touch, agreeing with child, indicating child's behavior is correct, thanking the child, praising child's effort.</td>
</tr>
<tr>
<td></td>
<td>Uses descriptive language</td>
<td>Comments that both labels and connects objects and actions or connects nouns and adjectives.</td>
</tr>
<tr>
<td></td>
<td>Follows child's lead</td>
<td>Noticing what interests the child and either commenting on the child's interest or joining in the same activity without interrupting the behavior.</td>
</tr>
<tr>
<td></td>
<td>Maintains or Extends child's focus</td>
<td>Introducing materials or interacting in a novel manner to maintain and/or extend the child's focus without disrupting the child's attention.</td>
</tr>
<tr>
<td></td>
<td>Uses Stress Reducing Strategies</td>
<td>Using soothing behaviors such as providing a pacifier, cradling, or rocking with a distressed infant.</td>
</tr>
<tr>
<td>Child Engagement</td>
<td>Follow through</td>
<td>Extent to which child follows through and responds to the parent's attempt to engage the child as seen in vocalization, gesturing, or attempting the requested action.</td>
</tr>
<tr>
<td></td>
<td>Positive Feedback</td>
<td>Positive social signals directed toward caregiver including: smiling, laughing, eye contact, vocalizing, words, or gentle touch.</td>
</tr>
<tr>
<td></td>
<td>Sustained Engagement</td>
<td>Active social or non-social engagement for as marked by at least 30 seconds of sustained visual attention to toys, materials, or face.</td>
</tr>
</tbody>
</table>
Table 2
*Correlations between parent-child interaction at 6 and 12 months*

<table>
<thead>
<tr>
<th></th>
<th>Parent support 6 mo</th>
<th>Child engagement 6 mo</th>
<th>Parent support 12 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child engagement 6 mo</td>
<td>r .559**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N 114</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent support 12 mo</td>
<td>r .518**</td>
<td>.281*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N 68</td>
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<tr>
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<td>r .292*</td>
<td>.328**</td>
<td>.657**</td>
</tr>
<tr>
<td></td>
<td>N 68</td>
<td>68</td>
<td>73</td>
</tr>
</tbody>
</table>

*Note* *p < .05, **, *p < .01*
Table 3
Risk profiles generated by cluster analysis (Older African American, Younger African American, Older Latino). Risk factor measures (dichotomous variable % or continuous variables mean ± 1SD) as a function of cluster analysis.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Older African American (n=27)</th>
<th>Younger African American (n=22)</th>
<th>Latino (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Caregiver Under 21 Yrs</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Single Status</td>
<td>43.20%</td>
<td>71.90%</td>
<td>13%</td>
</tr>
<tr>
<td>Years of Education Completed</td>
<td>13.32</td>
<td>11.66</td>
<td>10.46</td>
</tr>
<tr>
<td>Number of Adults in Household</td>
<td>1.91</td>
<td>2.97</td>
<td>2.87</td>
</tr>
<tr>
<td>Number of Children in Household</td>
<td>1.55</td>
<td>2.03</td>
<td>3.57</td>
</tr>
<tr>
<td>IT HOME Score</td>
<td>36.16</td>
<td>33.84</td>
<td>31.87</td>
</tr>
<tr>
<td>Primary Caregiver Depression</td>
<td>10.77</td>
<td>8.84</td>
<td>13.39</td>
</tr>
<tr>
<td>Media Exposure (Avg. minutes/day)</td>
<td>542.68</td>
<td>525.69</td>
<td>337.04</td>
</tr>
</tbody>
</table>

Note. Risk factor is reported as percentage for dichotomous variables or mean score for continuous variables.
Table 4  
*Correlations between parent support and child language outcomes*

<table>
<thead>
<tr>
<th></th>
<th>Parent support 6 mo</th>
<th>Child engagement 6 mo</th>
<th>Parent support 12 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestures 12 mo</td>
<td>r -0.11</td>
<td>0.026</td>
<td>-0.087</td>
</tr>
<tr>
<td></td>
<td>N 72</td>
<td>72</td>
<td>73</td>
</tr>
<tr>
<td>Vocalizations 12 mo</td>
<td>r 0.134</td>
<td>0.037</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>N 70</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Single words 12 mo</td>
<td>r .313**</td>
<td>-0.019</td>
<td>-0.038</td>
</tr>
<tr>
<td></td>
<td>N 70</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Multiple words 12 mo</td>
<td>r 0.195</td>
<td>-0.109</td>
<td>.255*</td>
</tr>
<tr>
<td></td>
<td>N 70</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Total ECI 12 mo</td>
<td>r 0.074</td>
<td>0.033</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>N 72</td>
<td>72</td>
<td>73</td>
</tr>
</tbody>
</table>

*Note.* *p < .05, **, *p < .01*
### Table 5

**12-Month Word Utterances by Risk Profile and Parent Support**

<table>
<thead>
<tr>
<th>Step</th>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Older African American</td>
<td>1.445</td>
<td>0.739</td>
<td>3.823</td>
<td>1</td>
<td>0.051</td>
<td>4.242</td>
</tr>
<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Younger African American</td>
<td>0.434</td>
<td>0.711</td>
<td>0.372</td>
<td>1</td>
<td>0.542</td>
<td>1.543</td>
</tr>
<tr>
<td></td>
<td>Parentsupport6mo</td>
<td>1.536</td>
<td>0.674</td>
<td>5.19</td>
<td>1</td>
<td>0.023</td>
<td>4.648</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>-3.85</td>
<td>1.128</td>
<td>11.66</td>
<td>1</td>
<td>0.001</td>
<td>0.021</td>
</tr>
</tbody>
</table>

<sup>a</sup> Variable(s) entered on step 1: parentsupport6mo.
Figure 1-5

Figure 1
Parent Support across Time in Free Play

Figure 2
Parent Support across Time in Bookreading

Figure 3
Parent Support across Time in Drawing

Figure 4
Parent Support across Time while Co-Viewing Baby Magazine

Figure 5
Parent Support across Time while Co-Viewing Science Book
Appendix A: Examples of items from the IT-HOME

1. **Responsivity** is the extent to which the parent responds to the infant’s behavior.
   
   Parent spontaneously vocalizes to infant at least twice. Can refer to any sound or words emitted by the parent except scolding or chastising. Must be spontaneous as opposed to having occurred in response to some vocalization of the infant.

2. **Acceptance** refers to parental acceptance of less than optimal behavior from the infant and the avoidance of undue restriction and punishment. Parent does not express overt annoyance with or hostility to infant. Parent doesn’t complain that the infant is hard to take care of, that he is wearing her out, that he/she “will not mind”, or call him “bad” without the affection.

3. **Organization** refers to the extent to which there is regularity and predictability (without monotony) in the family’s schedule, to the safety of the environment, and to the utilization of community services as part of the family support system. Infant gets out of house at least four times a week. Refers to simply going outside of the house; may be just outside to the yard, or on an errand with the parent.

4. **Learning materials** refers to the availability of appropriate play and learning materials capable of stimulating development. They are materials which, when used by the infant, provide tools for the development and refinement of crucial skills which must be acquired during the infant/toddler years. What is important is whether the toy is available and accessible to the infant and whether the infant is allowed to touch, feel, manipulate, move, listen, and have fun in the process even though s/he may not choose to do so. It does not matter whether the infant chooses to use the toy or it belongs to the infant. Stroller or walker, kiddie-car,
scooter, or tricycle. Anything with wheels that a infant can ride on or in, or a large
wheel toy that the infant can manipulate.

5. *Involvement* is the extent to which the parent is actively involved in infant’s
learning and provides stimulation for increasingly mature behavior. Parent talks to
infant while doing household work. “Talking” in this item means that the parent,
in the course of her or his own work activities, finds a way to include the infant in
what is going on. The critical thing is that these comments occur within hearing
range of the infant or possibly with direct eye contact. Examples include
“Mommy’s going to wash these dishes now”; or “It’s time for me to go to work”
or “I don’t see how one family can get a house so dirty.”

6. *Variety* refers to the inclusion in daily life of people and events that bring some
variety (without disorganization) into the infant’s life. Family visits relatives or
receives visits once a month or so. They need not be blood relatives. However,
they must be someone regarded by the parent as “family.” Visits TO and FROM
the family count.
FAMILY ROUTINES

1. Could you describe for me a typical day for your infant at home?

2. Does ___ ever go through a little routine of acting like s/he has nothing to do, nothing to play, and maybe whines or acts bored? If this happens, what do you do? (parent structuring play Q38)

3. Is ___ old enough to like to be read to? How many times each week would you say you read a story to her/him? (3x week Q42)

4. Some babies will eat at the same time each day, and for others it will depend on what is going on that day; How do you manage meal time at your house?
   a. In some families, people eat at different times each day, and in others there are routines; how are meals in your family?
   b. Does ___ eat at the table with the rest of the family? Or do you feed him/her separately?
   1x day with both parents Q43

5. A young infant demands a lot of attention. How do you arrange things when you need to do housework?
   a. When you do housework do you concentrate entirely on it, or do you sometimes make conversation with __ while you do your work? (talks housework Q35)

6. Does _____ have a father figure in the home?
   a. If there is a father figure: Does he give you some help with ___?
b. Does he do it regularly? At least 15 to 20 minutes or so each day? (father Q41)

AVAILABLE TOYS & LEARNING MATERIALS

1. What toys does ___ play with?
   a. Tell me about some of the toys you have for ___?
      muscle activity toy Q26 push/pull toy Q27 toy with wheels Q28
      cuddle/role-playing toy Q29 learning facilitator/furniture Q 30
      simple eye-hand coordination Q31 complex eye-hand coordination Q32
      1 literature and 1 music Q33

2. Where does ___ keep most of his/her toys and treasures? (place for toys Q24)

3. How do you get her/him to play with a toy that you think is an especially good one? (encourages older toys Q37)

4. It can be difficult to stay one step ahead of a young infant when it comes to getting toys. How do you make decisions about what toys to get? (challenging toys Q39)

5. When you have young infants, it can be difficult to find time to read.
   a. Do you have any books for yourself here in the house?
   b. About how many? (10 books Q19)

6. Does ___ have any books that are completely his/her own? About how many?
   3 children’s books Q45

7. Does your family have a pet? (Does ___ pay much attention to it?) (has pet Q13)
TRAINING & DISCIPLINE

1. What are some things you have tried to teach ______ to do? (help develop Q36)

2. Of course, small children don’t always do what we want them to do. In general does ______ mind you pretty well? (physical 0-1x week Q12)
   a. How do you discipline him/her?
   b. What does it take to get him/her to mind?
   c. Think about last week and tell me how many times you had to do that.
   d. Do you ever have to spank him/her?
   e. Think about last week and tell me how many times you had to spank him/her?

3. Sometimes infants this age love to play in things that get them messy — mud, water, their food. Does ______? (permits messy play Q1)
   a. How do you feel about that? What do you do when that happens?

OUTSIDE TRIPS

1. Tell me some of the places you go and take ___ with you. About how often do you make these trips? Grocery 1x week (Q21) Doctor 1x month (Q23)
   (Q23)
   [At least yard 4x week (Q22) relatives 1x month (Q44)]

2. Do you ever take ___ out in the yard or a park, or walk her in a stroller? About how often? At least yard 4x week Q22

3. A child as young as ___ ties you down most of the time. Do you ever manage to get away by yourself?
a. Are there people who need to take care of your infant if you need to go out somewhere? Can you rely on these people to look after him/her?

3 regulars (Q20)  Father’s daily caregiving (Q41)

4. How much contact do you have with other members of your family? About how often do they come to see you? About how often do you go to see them?

(relatives 1x month Q44)
Appendix B. IGDI ECI Coding Definitions

**Gestures**

A gesture is a physical movement made by the infant in an attempt to communicate with the partner. An episode ends when there is a clear and distinct change in infant's movement.

<table>
<thead>
<tr>
<th>Includes:</th>
<th>Excludes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• giving or showing object</td>
<td>• reaching for toys the partner is not holding or is only holding to stabilize it</td>
</tr>
<tr>
<td>• pushing away or rejecting an object</td>
<td>• moving toys in a way that does not involve interaction with the partner</td>
</tr>
<tr>
<td>• reaching toward a partner or object the partner is holding</td>
<td>• physical movements that appear to be coincidental</td>
</tr>
<tr>
<td>• pointing toward an object or person</td>
<td>• physical movement showing excitement or pleasure that is not in direct communication with the partner, e.g., waving arms</td>
</tr>
<tr>
<td>• nodding or shaking head to indicate &quot;yes&quot; or &quot;no&quot;, shrugging shoulders</td>
<td></td>
</tr>
<tr>
<td>• gestures made in conjunction with vocalizations, single- or multiple-words</td>
<td></td>
</tr>
</tbody>
</table>

**Vocalizations**

A vocalization is a non-word or unintelligible verbal utterance voiced by the infant to a partner. Utterances that are coded as vocalizations are those that cannot be understood as single- or multiple words. When vocalizations co-occur in utterances where single- or multiple-words are understood, the vocalization(s) should not be recorded. Vocalizations are only recorded when they occur in an utterance consisting only of vocalizations, or
gestures and vocalizations. An utterance ends when there has been a clear break of at least one second without vocalizations (count to yourself: "one thousand one") or a breath.

<table>
<thead>
<tr>
<th>Includes:</th>
<th>Excludes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• laughing out loud</td>
<td>• crying</td>
</tr>
<tr>
<td>• animal sounds, e.g., &quot;moo,&quot; when looking at a cow</td>
<td>• involuntary noises, e.g., hiccups</td>
</tr>
<tr>
<td>• transportation/motor sounds, e.g., &quot;vroom,&quot; when pushing a tractor</td>
<td>• if a given utterance includes a recognizable word or word combinations, the utterance should be coded as a W or M</td>
</tr>
<tr>
<td>• sounds such as &quot;ah,&quot; &quot;da,&quot; &quot;eee,&quot; etc.</td>
<td></td>
</tr>
<tr>
<td>• vocalizations that serve as fillers, such as “mm,” or “huh”</td>
<td></td>
</tr>
</tbody>
</table>

**Single-Word Utterance**

A single-word utterance is a single word voiced by the infant that is understood. Each single word utterance is given a weight of 2 (each tally is multiplied by two). This calculation is done automatically through the website as infant assessment data are entered into website. Otherwise, you will need to do the calculations on the coding form.

<table>
<thead>
<tr>
<th>Includes:</th>
<th>Excludes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• continuous repetition of a single word, e.g., &quot;go, go, go&quot; (code only one)</td>
<td>• vocalizations that serve as fillers, such as “mmm,” or “huh”</td>
</tr>
<tr>
<td>• compound words, e.g., &quot;mailbox,&quot; &quot;necklace&quot; (code only one)</td>
<td>• sentences or a phrase</td>
</tr>
</tbody>
</table>
- ritualized duplications, e.g., "bye-bye," "uh-oh," "night-night" (code only one)
- two part proper names, e.g., Big Bird, Mary Jane
- sequentially describing or naming objects, e.g., "block, red, blue, girl" (tally for each word)
- standard sign language, code as appropriate for single words
- an utterance in which only one word is understandable

<table>
<thead>
<tr>
<th>combining different understandable words (code as M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>utterance in which no words are understood (code as V)</td>
</tr>
<tr>
<td>utterance in which 2 or more words are understood (code as M)</td>
</tr>
</tbody>
</table>

**Multiple-Word Utterance (M)**

A multiple-word utterance is a combination of two or more different words voiced by the infant that are understood. In this case, an utterance consists of a sentence or multiple words that go together. Do not separate "false start" or stuttering into another utterance (code as one). False starts are when an infant starts to say something, but before finishing the sentence or thought, changes wording to another sentence. E.g., "I think this is ... this looks like a dog." Code this as one multiple-word utterance. Each multiple-word utterance is given a weight of 3 (each one is multiplied by three). This is done automatically through the website if infant data are entered into the website. Otherwise, calculations should be made on the coding form.

<table>
<thead>
<tr>
<th>Includes:</th>
<th>Excludes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- words should fit together in a meaningful way that</td>
<td>- unless coder can state exactly what infant said, code as V</td>
</tr>
</tbody>
</table>
approximates a phrase or sentence, e.g., big truck

- does not need to be grammatically correct, e.g., "me go to store"
- does not need to have adult meaning, "cow rides tractor"
- standard sign language, code as appropriate for multiple-word utterances

- if no words are understood then code as V
- utterance in which only one word is understood (code as W)
- utterance in which no words are understood (code as V)