

The mediating role of parenting in the associations between household chaos and children's representations of family dysfunction

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Abstract:

Children's drawings are thought to reflect their mental representations of self and their interpersonal relations within families. Household chaos is believed to disrupt key proximal processes related to optimal development. The present study examines the mediating role of parenting behaviors in the relations between two measures of household chaos, instability and disorganization, and how they may be evidenced in children's representations of family dysfunction as derived from their drawings. The sample ($N = 962$) is from a longitudinal study of rural poverty exploring the ways in which child, family, and contextual factors shape development over time. Findings reveal that, after controlling for numerous factors including child and primary caregiver covariates, there were significant indirect effects from cumulative family disorganization, but not cumulative family instability, on children's representation of family dysfunction through parenting behaviors. Results suggest that the proximal effects of daily disorganization outweigh the effects of periodic instability overtime.

Keywords: household chaos | children's representations | parenting | family dysfunction | poverty

Article:

Children's drawings are thought to reflect the child's mental representations of self and their interpersonal relations within families (Clarke, Ungerer, Chahoud, Johnson, & Stiefel, 2002; Fury, Carlson, & Sroufe, 1997; Kaplan & Main, 1986). Despite the limited empirical work on children's representations of family functioning (as assessed in children's drawings), the

preliminary findings support the idea that children's drawings might tap into their representations of family relationships. Much of the early work with children's family drawings has been related to their associations to attachment categories.

The quality of the attachment relationship is the collective product of the child's bids for attention, and the caregiver's accessibility, acceptance, cooperation, and sensitivity to their child (Ainsworth, 1979). Securely attached children develop a view of their caregivers as responsive and warm, and subsequently develop internal working models that they themselves are deserving of care and love (Bowlby, 1982). These internal working models guide the child's subsequent processing of social experience and behavior, and purportedly influences their conceptualization of his/her family through projective measures such as family drawings.

Attachment theorists posit that understanding children's representations is important because they provide a window into children's internal working models, or beliefs regarding self and relationships (Bowlby, 1969). Prior research using children's drawings supports this view. For example, Fury et al. (1997) reported in a study of 171 eight-year-olds from a high risk sample that infant attachment classifications based on observation of child behavior during the Strange Situation were significantly associated with children's drawing of their family at age eight. More recent studies have replicated this finding (Madigan, Goldberg, Moran, & Pederson, 2004; Madigan, Ladd, & Goldberg, 2003) and have found additional associations with the quality of the home environment (Carlson, Sroufe, & Egeland, 2004).

The role of the home environment to children's socioemotional development has been well documented (for reviews, see Bradley, Corwyn, McAdoo, & García Coll, 2001; McLoyd, 1990); nonetheless, few studies have documented the extent to which the home environment may be related to children's understanding of family functioning. For example, the family environments of children from low income backgrounds are often characterized by organizational chaos, lack of structure and routine, and excess background noise and crowding (Evans, 2006; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005; Vernon-Feagans, Garrett-Peters, Willoughby, & Mills-Koonce, 2012), and involves frequent exposure to new environments within the home. New environments include a change in physical location or exposure to new people, such as frequent changes in caretakers for children (Bronfenbrenner & Evans, 2000). As noted by Evans (2006), simple routines such as sharing meals together as a family and having a consistent bedtime for children can become difficult amidst a chaotic environment.

Chaotic home environments have long been associated with a range of adverse outcomes in children (Evans, 2006; Evans & Wachs, 2010) including behavior problems such as internalizing and externalizing behaviors (Ackerman, Brown, & Izard, 2004; Cooper, Osborne, Beck & McLanahan, 2011; Ziol-Guest & McKenna, 2014), conduct problems (Deater-Deckard et al., 2010), poor language development (Vernon-Feagans et al., 2012), and cognitive and communication skills (Evans & Wachs, 2010; Wachs and Chan, 1986). Children from low-income households appear to be at increased risk for experiencing greater levels of chaos within

the home (Bronfenbrenner & Evans, 2000; Evans, 2003; Evans & English, 2002). Families facing economic hardship often live in more noisy, crowded residences with substandard housing quality (Evans & English, 2002). Parents may have limited or inconsistent childcare arrangements and work nontraditional or variable jobs with unpredictable schedules that can interfere with family routines (Evans, 2004). For example, parents of low-income households may need to spend more time working to support their families than their more economically stable counterparts and therefore may have less time to spend creating structure and routine within the home (Dumas et al., 2005).

Most previous studies have conceptualized chaos as a single indicator (e.g., crowding or neighborhood noise) and/or a parent report composite index measured as at a single point in time (Matheny, Wachs, Ludwig, & Phillips, 1995). Parent reports, however, are inherently subjective and may be influenced by factors beyond the level of chaos in the home, such as crowding, parental coping strategies, and personality traits (Kaya & Weber, 2003; Wachs, 2013; Wachs & Corapci, 2003). More recent work has moved beyond individual indicators or a single index toward the conceptualization of chaos as consisting of multiple constructs or dimensions. Two key dimensions have been identified: disorder and instability/turbulence (Brooks-Gunn, Johnson, & Leventhal, 2010; Vernon-Feagans et al., 2012). Disorder includes disorganization and “high levels of noise, excessive crowding, clutter, and lack of structure” (Sameroff, 2010, p. 258). Instability/turbulence is described as changes in settings and relationships in the home and the unpredictability of routines.

A number of studies focusing on chaos have used Bronfenbrenner’s Bioecological model as a theoretical framework (e.g., Evans, Lepore, Shejwal, & Palsane, 1998; Hardaway, Wilson, Shaw, & Dishion, 2012). A fundamental tenet of this theory is the attention given to the connections between context (i.e., environment) and person (i.e., developmental outcomes). This theory suggests that a person’s environmental context is the driving force of development through both direct and indirect interactions between process, person, context, and time (Bronfenbrenner & Morris, 1998). Chaos may interfere with the development and sustainability of proximal processes, such as adult–child interactions, because it can shorten their duration and increase interruptions, rendering exchanges of energy between the developing child and the surroundings less predictable. In contrast, chaos may also *intensify* proximal processes given the level of stresses and fatigue in parents and other caregivers who must also contend with chaos thereby making them more abrupt or hostile in their caregiving behaviors.

Given established links between household chaos, parenting, and child adjustment, the importance of understanding children’s developing perspectives on the interpersonal dynamics within the family is increasingly stressed by researchers (Fine, Coleman, & Ganong, 1999). For example, although several studies demonstrate correlations between household chaos and developmental outcomes (Brody & Flor, 1998; Deater-Deckard et al., 2009; Hart, Petrill, Deater Deckard, & Thompson, 2007) the specific mechanisms by which chaos affects developmental outcomes remains less clear. From an ecological perspective, the accumulation of

overstimulation and instability due to chaos may slowly change the way that a child perceives herself, others, and relationships between self and others within the family. The present study explores the direct and indirect paths through which the cumulative experience of household chaos during the first five years of life is associated with children's representations of family dysfunction in first grade and whether this association is mediated by parenting.

Chaos and child representation of family functioning

One method for examining children's interpretations of their social environments is through their drawings. Drawing is a common activity for many children and researchers posit that long before children can put their complex feelings and thoughts into words, they can express both conscious and unconscious thoughts, wishes and concerns in their drawings (Fury et al., 1997, cited in Koppitz, 1968, p. 1154). Recently, developmentalists have demonstrated that characteristics of children's drawings, including images and color choices, are ways to understand individual differences in child functioning and may provide clinicians and researchers with valuable information about a child's inner representation of self and his/her family. For example, Goldner and Schraf (2012), reported that aspects of children's drawings were significantly related to their internalizing symptoms. Further, in a study of attachment categories and classroom functioning, Pianta, Longmaid, and Ferguson (1999) reported that Kindergarten children with drawings judged as reflecting secure attachment were rated more sociable with their peers, more task oriented, and more socially competent than children whose drawings reflected insecure attachment (Pianta et al., 1999). Additional studies have supported the use of children's drawings to understand individual differences in family functioning (see for example, Fihrrer & McMahon, 2009; Leon, Wallace, & Rudy, 2007).

The emotional investment the child places in drawing may be reflected in the embellishment, detail, vibrancy, and creativity as well as the size of objects and people (Burkitt, Barrett, & Davis, 2003). For example, vibrant use of color and common characteristics across family members may denote a sense of belonging and commonality. In contrast, figures that appear constricted, without color or detail, careless in appearance, or scribbled/crossed out in the drawing may be reflective of tension or anger (Fury et al., 1997).

Based on preliminary investigations conducted by Kaplan and Main (1986), a theoretically-based scoring system was devised that includes rating scales for family pride, vulnerability, emotional distance, tension, role reversal, and global pathology (see Fury et al., 1997). Since its development, the coding system has had a number of successful applications and Fury et al. (1997) have demonstrated the utility of the Family Drawing Paradigm (FDP) in assessing representational models of family functioning and child attachment.

The FDP has been validated as a representational measure of attachment and family dysfunction within diverse racial, ethnic, and international samples (Goldner & Scharf, 2012; Pianta et

al., 1999; Shiakou, 2012), longitudinal samples (Fury et al., 1997; Roe, Bridges, Dunn, & O'Connor, 2006), and victims of childhood maltreatment (Shiakou, 2012).

Studies examining the associations between children's representations of family relationships and children's peer relations have found children's cognitive representations of self and relationships with others to be related to peer competence (Boivin & Hymel, 1997; Schudlich, Shamir, & Cummings, 2004). Additional research has documented similar linkages between children's negative representations of self and family to their socioemotional adjustment (see for example, Rudolph, Hammen, & Burge, 1995). These early studies provide support for the notion that children's representations of self and family relationships and their social experiences are interrelated. Extending this line of inquiry, aspects from children's drawings of family may provide clues not only into young children's understanding of their family relationships but also their broader home environment. In home environments that are characterized as having chaotic activity and unpredictability, in conjunction with intense background stimulation such as crowding or excessive noise, the lack of structure can negatively impact children by depriving them of predictable and sustained interactions with caregivers that foster healthy development (Bronfenbrenner & Evans, 2000). With developmentally-facilitative transactions attenuated due to lack of longevity, regularity, or intensity, chaos may impact children's understanding and representations of the family dysfunction as manifested through their drawings. Thus, given the linkages between chaos and children's adjustment, it becomes important to understand the mechanisms by which chaos may be related to children's representation of family dysfunction. Prior research suggests that one mechanism by which chaos may be related to children's understanding of family relationships is through parenting.

The mediating role of parenting

Past research has identified parenting behaviors as an indirect mechanism through which chaos influences child outcomes (e.g., Coldwell, Pike, & Dunn, 2006; Conger, Conger, & Martin, 2010; Vernon-Feagans et al., 2012); however, less is known about parenting as a mediator with respect to children's representations of family dysfunction through their drawings. For example, in addition to negatively impacting children, chaos has been shown to negatively impact parents and their parenting behaviors (e.g., Corapci & Wachs, 2002; Evans et al., 1998). Coldwell et al. (2006) noted that household chaos was positively associated with caregivers who were less responsive, less involved, and more likely to interfere with exploration. Additional studies indicate that parents exhibit less parental warmth and adopt harsher parent-child interactions when living in chaotic environments compared to home environments that are less hectic (Matheny et al., 1995).

In terms of parenting behaviors, childhood researchers often examine sensitive and harsh intrusive caregiving. High levels of parental sensitivity/responsiveness that reflect parenting behaviors that are responsive, warm, child-centered, and/or stimulating have been linked to myriad positive outcomes in children. In contrast, low levels of parental

sensitivity/responsiveness, including untimely and inappropriate responses to child signals, interfere with emotion regulation development, placing children at risk for poor socioemotional adjustment (NICHD ECCRN, 2003) and academic competence (NICHD ECCRN, 1999; Rimm-Kaufman, Pianta, Cox, & Bradley, 2003) and less positive self-esteem and identity (Bean, Bush, McKenry, & Wilson, 2003). Harsh intrusive parenting is defined as a constellation of insensitive, interfering parenting behaviors rooted in the mother's lack of respect for her child's autonomy. The research on the associations between chaos and parenting would suggest that continued exposure to noise and crowding may increase physical fatigue, thereby lowering the parents' cooperativeness and increasing their aggression (Corapci & Wachs, 2002). Additional research suggests that greater psychological distress among families living in crowded conditions may leave caregivers overwhelmed by the stress of parenting, reducing their responsiveness to child needs (Conger et al., 2010; Schultz, Izard, & Ackerman, 2000).

Although research linking parenting behavior to child representation of family functioning is sparse, there is evidence suggestive of an association. For example, using children's family drawings, Dallaire, Ciccone, and Wilson (2012) found that child-report of hostile caregiver behavior was associated with overall insecurity in children's family drawings. Fihrrer and McMahon (2009) found greater exposure to maternal depressive episodes was associated with higher ratings of global pathology. Leon and Rudy (2005) reported that family drawings that were rated high in role reversal were associated with greater mother-reported parental conflict. Goldner and Scharf (2012) used Kaplan and Main's coding system to assess children's family drawings as a diagnostic tool to detect children's internalizing symptoms among low SES elementary-school children. They found that aspects of children's drawings linked maternal characteristics (depression) and family dysfunction (inter-parental conflict frequency) to internalizing problems in boys and girls. In addition, Carlson et al. (2004) used a longitudinal, cross-lag approach to understanding early home environment and subsequent socioemotional functioning through children's drawings. Their findings revealed that early experiences were related to relationship representation in early childhood as assessed by a preschool interview, which in turn influenced later representations of relationships as assessed by children's family drawings, which in turn influenced adolescent social functioning.

The current study

The present study examines the relations between the cumulative experience of chaos during the first five years of life and children's representations of family dysfunction through their drawings, as well as the mediating role of parenting behaviors in this association. Although past research has provided suggestive evidence to support this model, this study is, to the best of our knowledge, the first to explicitly test a mediational pathway from household chaos to children's representation of family dysfunction through sensitive and harsh intrusive parenting behaviors.

In the present study, chaos is defined as two distinct dimensions: *family instability* and *family disorganization* (Evans & Wachs, 2010; Sameroff, 2010; Vernon-Feagans et al., 2012).

Instability describes a chronically chaotic and unpredictable family environment. The indicators of family instability include residential mobility, the number of intimate adult relationships involving the primary caregiver, and the number of families with whom the child has lived (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999). In contrast, family disorganization is indexed by ambient noise in the home/neighborhood, television watching in the home, household crowding, and disorganized family routines (Evans, Maxwell, & Hart, 1999; Johnson, Martin, Brooks-Gunn, & Petrill, 2008; Matheny et al., 1995). Based on the extant literature, we propose that in a large, socioeconomically and racially diverse rural sample and after controlling for child and primary caregiver covariates (e.g., child race, temperament, sex, IQ, and data collection site), parenting behaviors (i.e., sensitivity and harsh intrusiveness) will each mediate the pathways from the family disorganization and the family instability to children's representations of family dysfunction independent of pathways from family income.

Methods

Participants

The sample for the proposed study is drawn from the Family Life Project (FLP). The FLP is a longitudinal, multi-method, multi-respondent study of rural poverty that explores the ways in which child, family, and contextual factors shape child development over time. The FLP is based on a developmental, epidemiological sampling design in which a representative sample of low-wealth families in Pennsylvania and North Carolina was recruited, with an oversampling of African American families in North Carolina. FLP families were recruited in person at hospitals and over the phone using birth records. Eligibility criteria included residency in the target counties, English as the primary language spoken in the home, and plans to stay in the area for the next three years. A total of 1292 families enrolled in the FLP by completing the first home visit when the family's infant was two months old (see Willoughby et al., 2013 for additional information about the recruitment and sampling procedures). Of the original sample ($N = 1292$), 962 families participated in the family drawing task when the target child was in the first grade. Among the families who participated in the first grade home visit ($N = 962$), 88% participated in six or seven of the seven possible data collection time points (i.e., when target children were approximately 2, 6, 15, 24, 36, 60 months of age and in grade 1). Hence, there was appreciable longitudinal data from which to derive cumulative measures of household income, parenting, and chaos. The sample was balanced with regards to child gender (49.6% female) and moderately diverse (40.5% African American). Mean household income-to-needs ratio for the household was 1.81, with a range of 0–16.49 (an income to needs ratio of 1.0 corresponds to the federal poverty threshold for that household size). At the 6-month visit, mean maternal age was 26.5 ($SD = .61$) with a range of 14.7–58.2 years. Also at the 6-month visit, mean maternal education was 13.3 years ($SD = 1.7$) with a range of six years of education to professional degrees.

Procedures

At the initial visit, which occurred when the target child was two months of age, one research assistant used a laptop computer and entered information from the mother on demographics of household members, mother and partner employment, childcare arrangements, and other key variables. Two research assistants visited children and their families when the children were 6, 15, 24, 36, 48, 60 months of age, and again when the child was in first grade. During the home visits, the research assistants conducted interviews with the mothers and administered questionnaires, conducted child assessments, and videotaped interactions between children and adults (mother and secondary caregiver, if present).

Measures

Household chaos

Ten indicators of chaos were measured and factored into the two dimensions of *instability* and *disorganization* that Sameroff (2010) concluded were the major dimensions from recent work on chaos (Evans & Wachs, 2010; Vernon-Feagans et al., 2012). The 10 cumulative indicators of household chaos were derived from data collected at home visits when target children were approximately 2, 6, 15, 24, 36, 48 and 60 months old. Family instability included five indicators: (1) *the total number of times the child moved* (physically to another residence), (2) *the total number of changes in the primary caregiver* (usually involved change in primary responsibility for child from mother to other adult), (3) *the total number of changes in the secondary caregiver* (either primary caregiver partner or primary caregiver grandmother), (4) *the total number of different people in the household*, and (5) *the total number of times household members moved into or out of the household*. Household disorganization also included five indicators including: (6) *report of the average number of hours that the TV was on each day*, (7) *the average household density*, (8) *home visitor ratings of home visit preparation by the household*, (9) *home visitor ratings of the cleanliness of the household*, and (10) *home visitor ratings of the neighborhood noise level around the home*.

The first factor, labeled instability, included five variables: number of people moving in and out of the household, the total number of people in the household, the number of household moves, the number of changes in the primary caregiver, and the number of changes in the secondary caregiver. The second factor we labeled household disorganization, and it also included five variables: household density, the numbers of hours of TV watching, the preparation for home visits, the cleanliness of the home, and the neighborhood noise levels. Interestingly, these factors mapped almost completely onto the constructs identified as central to the definition of chaos (Evans & Wachs, 2010). The household instability and household disorganization factors had reasonable internal consistency (Cronbach's alphas of .76 and .67, respectively).

Maternal parenting behaviors

Maternal sensitive and harsh intrusive parenting behaviors were assessed during a series of parent-child interactions when the target child was 6, 15, 24, 36, and 60 months old. Mother-

child interactions were digitally recorded and subsequently coded to assess the levels of mother's sensitivity, detachment, intrusiveness, positive regard, and negative regard while interacting with the child (NICHD Early Child Care Research Network, 1999). When the child was six months and 15 months old, mothers and children completed a 10 minute, free-play activity in which they were presented with a standard set of toys. Mothers were instructed to interact with their children as they typically would if given some free time during the day. When the child was 24 and 36 months old, the same mother-child dyads completed a 10 minute puzzle task, in which they were presented with three developmentally appropriate puzzles of increasing difficulty. Parents were told that this was a task for the child to complete but they could provide any assistance that they deemed necessary. When the children were 60 months old, mother-child dyads were presented with two developmentally appropriate activities of increasing difficulty. The tasks at the 60 month assessment, which lasted 15 minutes, included an activity involving the mother and child building a replica of a tower using similar blocks of different shapes and sizes, and a card game in which mothers and children compete to try to win the most cards in the deck. As with earlier time points, mothers were told that this was a task for the child to complete but that they could provide any assistance they deemed necessary.

Maternal parenting behaviors were rated using six global rating scales: sensitivity/responsiveness, intrusiveness, detachment/disengagement, stimulation of cognitive development, positive regard, and negative regard, adapted from those used by the National Institute for Child Health and Human Development Study of Early Child Care (National Institute for Child Health and Human Development Early Child Care Research Network, 1999). Coders rated parenting behaviors on a 7-point scale, on which 1 = not at all characteristic and 7 = very characteristic. Both *frequency* and *intensity* of behaviors directed toward the child are considered. The sensitive caregiving scale, which was adapted from Ainsworth, Blehar, Waters, and Wall (1978), describes the degree to which the parent was aware of and responsive to the child's bids and signals, as well as the level of synchrony achieved with the child. The detachment/disengagement scale describes the degree to which the parent was emotionally distant, uninvolved, or unaware of the child's signals or needs for appropriate facilitation or care. The positive regard scale rates the quantity and intensity of the parent's expression of positive feelings toward the child, including praise, smiling, physical affection, playful behavior, and overall enjoyment. The stimulation of cognitive development scale measures the degree to which the parent engaged in age-appropriate behaviors that foster cognitive and physical development of the child. The negative regard scale rates the parent's negative affect for the child including disapproving, harsh, or hostile vocalizations or facial expressions.

Informed by an exploratory factor analysis, with an oblique rotation (i.e., promax), the individual subscales were composited to obtain overall sensitive parenting and harsh intrusive parenting scores. Sensitive parenting consisted of the mean of the reverse score for the detachment/disengagement scale and the scores for sensitivity/responsiveness, positive regard, and stimulation of cognitive development scales. Accordingly, higher scores on the sensitivity

subscale reflect parenting behaviors that are child-centered, engaged, warm, and stimulating. Harsh intrusive parenting scores were created by taking the mean of the negative regard scale and the intrusiveness scale. Thus, higher scores on the harsh intrusiveness subscale represent parenting behaviors that are parent-focused, harsh, controlling, and affectively negative. Interrater reliability for the composites assessed using Interclass Correlation (ICCs) across each pair of coders at each time point were .85, .89, .90, .87, .91 for sensitive parenting and .80, .81, .86, .85, .89, for harsh intrusive parenting for the 6, 15, 24, 36, and 60 month time points, respectively. At each time point, coders underwent training until acceptable reliability (ICC >.80) was achieved and maintained for each coder on every scale. Once acceptable reliability was established, coders began coding in pairs while also continuing to code at least 20% of their weekly cases with the master coder. The cases coded with the master coder were used for reliability. Each coding pair met biweekly to reconcile scoring discrepancies. The scores used in the analysis were the final scores arrived at after conferencing cases. Given repeated measures of parenting behaviors across multiple time points (i.e., 6, 15, 24, 36, and 60 months), the mean of each composite was used in analyses to reflect the cumulative effect of sensitive and harsh intrusive parenting.

Child representation of family dysfunction

During the course of the first-grade home assessments, each child completed a family drawing on a 12 × 18 inch sheet of white art paper using 10 basic colored felt-tip pens presented in standard order. In nearly all cases, this task was completed in relative seclusion from other family members while the primary and secondary caregivers were completing their questionnaires. Prior to beginning the task, the target child was asked to draw a “person” (any person) using a pencil and a standard 8 × 10 sheet of white paper. This initial warm-up task was intended to promote a relaxed atmosphere and to reassure the child that the drawing activity is not a test of ability. After doing the “warm-up” the child was presented with the task materials and asked to make a family drawing. No other instructions were given. Upon completion of the drawing, the research assistant asked the child to identify all of the people in the drawing. The research assistant then labeled the names and relationship of these people next to their image in pencil, being careful not to write over any of the actual drawing. All drawings were subsequently double coded by two coders who were blind to any other information about the child and final scores were determined by conferencing.

The coding system used for the present study was designed by Fury et al. (1997) who expanded Kaplan and Main’s (1986) methods by modifying discrete signs for a population of high risk children 8–9 years old and developed global ratings of the drawings. The current analyses use six 5-point rating scales (Family Pride, Vulnerability, Emotional Distance, Tension/Anger, Role Reversal, and Global Pathology) to compute a latent factor labeled as child representation of family dysfunction. Family pride as evidenced by positive facial affect across figures, vibrant use of color, and common characteristics across family members relates to a sense of belonging and happiness in the family. Vulnerability is based on size distortions, placement of figures, and

exaggeration of body parts. The scoring for role-reversal is based on relations of size or roles of figures. Emotional distance is based on disguised expressions of anger, neutral or negative affect, and mother–child distance. Tension/anger is based on obvious and apparent signs of anger such that figures seem constricted, closed, without color or detail, and careless in appearance. Global pathology is the degree of negativity, based on organization, completeness of figures, color, detail, affect, and background. Reliabilities were calculated using interclass correlations and were greater than .80 for all subscales. The Cronbach's alpha for the Family Dysfunction Score was .85.

Covariates

Given previous reports that document an association between a chaotic home environment and children's difficult, negative temperament (Wachs, Gurkas, & Kontos, 2004), child temperamental reactivity was used as a covariate. Child temperamental reactivity at age 6 months was assessed by the Infant Behavior Record (IBR; Bayley, 1969) as adapted for use by Stifter and Corey (2001) and completed independently by both home visitors. The IBR was applied to infant behavior observed globally across the entire home visit. The IBR scales included sociability, positive affect, attention, activity level, reactivity, and irritability. The summed mean score of the two data collectors' ratings was used. Alphas ranged from .70 (irritability) to .88 (attention). In addition to temperament, child race and sex were used as control variables given that each of these variables has been identified as a predictor of parenting behaviors (Conger et al., 2010; Schofield et al., 2011) and as risk factors for child developmental outcomes (Lerner, 2003; Linver, Brooks-Gunn, & Kohen, 2002). Further, some features of children's drawings are known to be related to cognitive ability (Pianta et al., 1999), and as such we also included child IQ as an additional control variable as measured by the Wechsler Preschool and Primary Scale of Intelligence – Third Edition (WPPI-III, Wechsler, 2002) at 36 months of age. Due to the literature linking maternal depression and parenting (see reviews by Goodman, 2007) and depression and chaos (Vernon-Feagans et al., 2012) maternal depressive symptomology was used as a covariate (The Brief Symptom Inventory, BSI; Derogatis, 2000). Due to high correlations between depression scores at each time point ($r_s = 0.83\text{--}0.88$), the means from the depression subscales were summed across all five time points. Given that the overwhelming majority of African American families resided in North Carolina, location of residence (Pennsylvania vs. North Carolina) was included to address a potential confound between site and ethnicity.

Data analysis plan

Analyses proceeded in two phases. First, the structure of the 10 indicators of cumulative (over the first five years of the children's lives) chaos was examined using a combination of principle components (PCA) and exploratory factor analyses (EFA). Second, a structural equation model (SEM) was estimated using full-information maximum likelihood estimation, which assumes that data were missing at random. In order to determine the factor structure for the chaos

variables, PCA was performed on the 10 cumulative indicators of chaos. PCA indicated that two eigenvalues optimally represented the covariation in these 10 items. Scree plots and parallel analyses were evaluated to determine the optimal number of factors to retain (Dinno, 2009; Floyd & Widaman, 1995). Both methods favored a two-factor solution. A follow-up EFA model was examined which forced extraction of two correlated factors.

For the second phase of the analysis, a structural equation model (SEM) was estimated to test whether children's representation of family dysfunction is predicted by the disorganization and instability dimensions of household chaos, and whether these associations are mediated through dimensions of parenting (above and beyond the effects attributable to child and primary caregiver covariates, including child temperament, race, sex, and IQ). The SEM was estimated using robust full-information maximum-likelihood estimation and included data from 962 participants who participated in the first grade home visit. Models were parameterized using the Mplus 6.0 software package (Muthén & Muthén, 1998–2010), using the robust maximum likelihood estimator. This estimator accommodates non-normal data by adjusting standard errors using the Huber-White sandwich estimator. Full information maximum likelihood (FIML) was used as the missing data technique (Arbuckle, 1996). Model fit was examined using a number of fit indices, including the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), and the root mean squared error of approximation (RMSEA; Browne & Cudeck, 1993). CFI and TLI values above .90 and RMSEA values below .05 indicate excellent model fit. In order to test our hypothesis, the latent variable for children's representation of family dysfunction was regressed upon each of the two chaos variables. After establishing this link, the latent variables for sensitive parenting and harsh intrusive parenting across childhood were added to the model as mediators of this relationship. Ethnic minority status, child cognitive ability, temperament, child gender, maternal education, and depression (The Brief Symptom Inventory, BSI; Derogatis, 2000) were included as covariates in this model. The data collection site (Pennsylvania vs. North Carolina) was also included as a control variable. Paths were estimated from all control variables to each of the four endogenous variables.

Results

Descriptive statistics

Means, standard deviations, and bivariate correlations between study variables are presented in Table 1. The associations between the variables were largely as expected, such that chaos instability was positively related to children's representation of family dysfunction, harsh intrusive parenting, maternal depressive symptoms, and child race, and was inversely related to sensitive parenting, family income-to-needs, and child cognitive ability. Chaos disorganization had a similar pattern of association but was also inversely related to child temperament. Drawings made by male children had higher ratings on family dysfunction representations than female children ($\mu = 2.24$, $SD = .73$ and $\mu = 2.01$, $SD = .68$, respectively) and drawings made by

African American children had higher ratings on family dysfunction representations than White children ($\mu = 2.29$, $SD = .76$ and $\mu = 2.01$, $SD = .67$, respectively).

Table 1. Correlation matrix for key variables.

Variables	1	2	3	4	5	6	7	8	9	10	11
Family Income to Needs Ratio	1										
Child Temperament	.03	1									
Child Cognitive Ability	.37**	.04	1								
Child Sex	.05	.03	-.14*	1							
Child Race	-.37*	.08**	-.36*	-.02	1						
Maternal Depression Symptoms	-.18*	-.02	-.11*	-.05	.06	1					
Chaos Instability	-.36*	.02	-.26*	-.04	.21**	.15*	1				
Chaos Disorganization	-.53*	-.10*	-.44*	-.01	.26**	.25*	.41**	1			
Sensitive Parenting [^]	.43**	.03	.38**	.01	-.39*	-.11*	-.27*	-.47*	1		
Harsh Intrusive Parenting ^{^^}	-.35*	.03	-.36*	.05	.32**	.10*	.21**	.36**	-.70*	1	
Children's Representation of Family Dysfunction ^{^^}	-.11*	.05	-.22*	.17*	.15**	.04	.12**	.14**	-.16*	.19*	1

Mean	1.82	10.70	93.57	.50	.46	.40	3.1	2.25	3.86	3.68	2.14
SD	1.72	1.29	16.48	.5	.54	.45	1.9	.58	1.10	1.18	.72

Note: * $p < .05$, ** $p < .01$ ^ Sensitive Parenting represents the mean of five indicators used in latent factor of sensitive parenting. ^^ Harsh Intrusive Parenting represents the mean of five indicators used in latent factor of harsh intrusive parenting. ^^^ Children's representation of family dysfunction is a mean of the six indicators used in the latent factor.

The household instability and household disorganization factors (see Table 2 for factor loadings) were positively correlated with each other ($r = .41, p < .01$), as well as with family drawings (r instability = .12; r disorganization = .14, $p < .01$) and sensitive parenting (r instability = $-.27$; r disorganization = $-.47, p < .01$) and harsh intrusive parenting (r instability = .21; r disorganization = .36, $p < .01$). The household instability and household disorganization factors were also related to maternal depression (r instability = .15; r disorganization = .25, $p < .01$), child cognitive ability (r instability = $-.26$; r disorganization = $-.44, p < .01$), and being African American (r instability = .21; r disorganization = .26, $p < .01$). Household disorganization, but not household instability, was related to child temperament (r disorganization = $-.10, p < .01$). Table 3 presents the means and standard deviations of both parenting variables across the five time points. Growth curve analysis suggested stability of parenting measures across time with a small significant slope for sensitive parenting and harsh intrusive parenting ($\beta = .016, p < .05$) and ($\beta = .08, p < .05$), respectively.

Table 2. Factor structure for chaos variables.

Chaos Variables ^a	Factor I: Instability	Factor II: Disorganization
# People in/out	.92	
# Total People	.81	
# HH moves	.54	
# PC	.34	
# SC	.55	
HH density		.52
TV hours/day		.32
Visit preparation		-.89

HH cleanliness		-.90
Neighborhood noise		-.84
Cronbach's alpha	$\alpha = .76$	$\alpha = .67$

Note: ^aFactor analyses were conducted with an oblique rotation (promax).

Table 3. Means of parenting composites across time points mean (SD).

Time Points	Sensitive Parenting	Harsh Intrusive Parenting
6 Months (N = 890)	2.9 (.79)	2.4 (.77)
15 Months (N = 889)	2.8 (.81)	2.3 (.68)
24 Months (N = 867)	2.9 (.81)	2.4 (.88)
36 Months (N = 880)	2.9 (.72)	2.3 (.81)
60 Months (N = 844)	2.9 (.71)	2.8 (.76)

Structural equation model

An SEM model was estimated using full-information maximum likelihood estimation, which assumed that data were missing at random. FIML works by estimating a likelihood function for each individual based on the variables that are present so that all the available data are used. In the present study, among the ($n = 962$) children who completed the family drawing task at the grade 1 visit, less than 3% were missing data on parenting composites, and less than 1% were missing data for the chaos variables. In addition, 3.5% of children were missing data on temperament ratings, 9% were missing data on cognitive ability.

The analyses reported in Figure 1 simultaneously considers the associations between the two dimensions of household chaos, family household income, latent factor of children's representation of family dysfunction, and the mediating role of the two latent parenting variables, sensitive parenting and harsh intrusive parenting across the first five years of the child's life. The model was an adequate fit to the data, $\chi^2(256, N = 962) = 1052, p < .00$, CFI = .91, TLI = .90, RMSEA = 0.05, SRMR = .04.

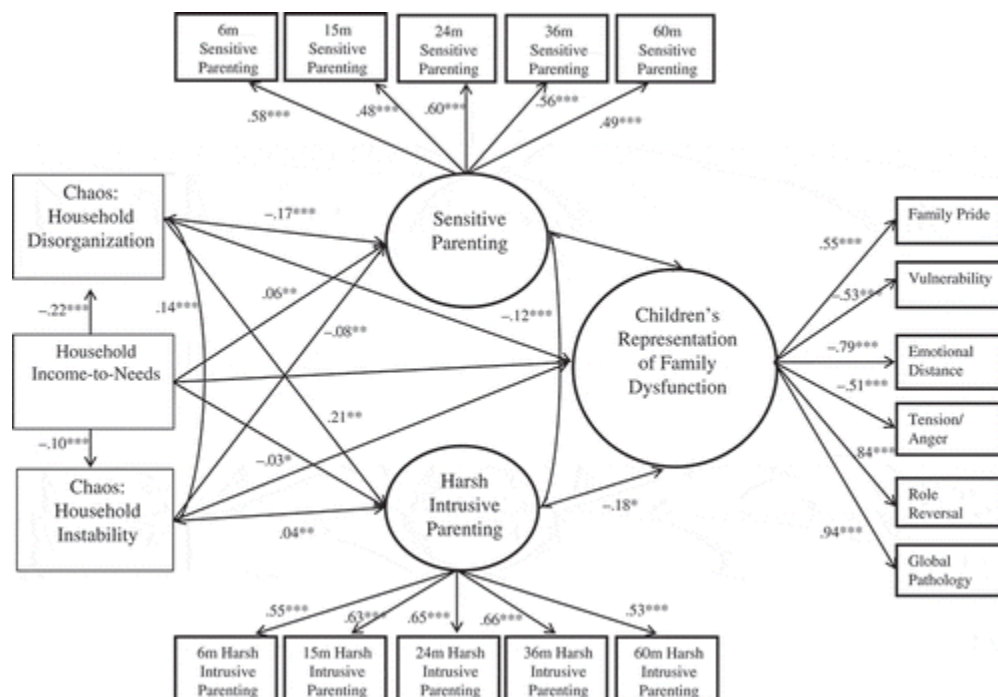


Figure 1. Pathways from household chaos to child representation of family dysfunction. Direct paths were included from all covariates to all exogenous variables in the model but are not shown. The covariance between vulnerability and emotional distance is also not shown. The model provides good fit to the data: χ^2 (256, N = 962) = 1052, CFI = 0.91, TLI = 0.90, RMSEA = .05, SMSR = .04.

As can be seen in Figure 1, when considered in a model with maternal parenting behaviors, the relation between household disorganization and child representation of family dysfunction is not significant. This was also the case with household instability and child representation of family dysfunction. Higher levels of household disorganization however, were associated with both higher levels of harsh intrusive parenting and lower levels of sensitive parenting ($\beta = .21, p < .01$; $\beta = -.17, p < .01$), respectively. Similarly, there was a direct effect of household instability with higher levels of harsh intrusive parenting and lower levels of sensitive parenting ($\beta = .04, p < .01$; $\beta = -.08, p < .01$), respectively. Our findings revealed that household income was inversely related to both household disorganization and household instability ($\beta = -.22, p < .001$; $\beta = -.10, p < .001$), respectively. In addition, our findings revealed that household income was inversely associated with harsh intrusive parenting and positively related to sensitive parenting ($\beta = -.03, p < .05$; $\beta = .06, p < .001$), respectively. Moreover, there was a significant indirect pathway from disorganization and child representation of family dysfunction through harsh intrusive parenting (disorganization → harsh intrusive parenting → family dysfunction = .06, $p < .05$), and also a pathway from household income to child representation of family dysfunction through chaos disorganization harsh intrusive parenting (income-to-needs → chaos disorganization → harsh intrusive parenting → family dysfunction = .01, $p < .05$).

Following procedures outlined by Holmbeck (1997, 2002), a second model was estimated, in which the path from household disorganization, household instability, and household income to children's representation of family dysfunction were set to zero. A chi-squared difference test revealed that constraining these paths to zero did not result in a significant decrement to model fit. These findings, in addition to the significant indirect effect, confirm full mediation indicating that, after controlling for the child's race, gender, cognitive ability, and temperament, the data collection site, and maternal depressive symptoms, maternal harsh intrusive parenting behaviors across the first five years of life fully mediated the relation between family disorganization over the child's first five years of life and the child's representations of family dysfunction at grade 1. In contrast, the indirect effects from household instability through either domain of parenting to child representation of family dysfunction was not statistically significant, although a mediating pathway from household instability through harsh intrusive parenting to child representation was near significant at $p = .07$. The model explains 14.7% of the variance in child representation of family dysfunction, 33.6% of the variance in sensitive parenting, and 27.5% of the variance in harsh intrusive parenting.

Discussion

The results from this study indicate that maternal caregiving across the first five years of life is a key mediating pathway by which household chaos and poverty are related to children's representations of family relationships. The present study examined the associations between the cumulative experience of chaos during the first five years of life and children's representations of family dysfunction through their family drawings, and the mediating role of parenting behaviors in this association. From an attachment perspective that posits that it is through the quality of early experiences with primary caregivers that children are thought to develop internal working models of self and others (Bowlby, 1969, 1982), the findings of this study reveal that children with harsh, intrusive caregiver experiences may develop negative internal working models of family functioning represented by their family drawings.

This study adds to the literature in several ways. Using data from an ethnically and economically diverse sample of families living in rural communities, this study increases understanding of the impact of family-level factors on children's representations of family dysfunction in an understudied population. The use latent variables that account for measurement error in an SEM framework allowed us to simultaneously examine the relations between multiple predictors, including two dimensions of chaos and two dimensions of parenting to expand our understanding of children's representations of family relationships. By measuring chaos cumulatively over the early years of life, the present study extends our understanding of the associations between chaos and child representation of family dysfunction in a community sample. Although past research has provided suggestive evidence to support this model, this study is, to the best of our knowledge, the first to explicitly test the relation between two domains of household chaos and children's representations of family dysfunction. Because much of the early work on chaos relied on a single measure of household chaos, the use of two domains of

chaos, *instability* and *disorganization*, provides a more nuanced understanding of the relations between household chaos and children's representations of family dysfunction. Moreover, this study is among the first to demonstrate that these two factors, extracted from 10 objective variables over children's first five years of life, are related to children's representations of family dysfunction through parenting behaviors in a representative sample of children in low-wealth communities. Furthermore, the longitudinal nature of the data (chaos and parenting) allowed a consideration of these relationships over a relatively large span of time (across the first six years of the child's life), providing a better understanding of the long-term effects of earlier experiences.

An additional strength of this study comes from the use of children's representations of family dysfunction versus parent reports of family functioning and/or child adjustment. For example, prior research suggests that distressed mothers tend to report negatively about themselves, their child, and their family (Kinsman & Wildman, 2001; Phares, Compass, & Howell, 1989). Findings by Treutler and Epkins (2003) highlight that the quality of the parent-child relationship was related to parent report of child adjustment, such that greater parental acceptance was inversely related mother report of poor child socioemotional functioning. Further, in their investigation of the environmental and genetic origins of children's perception of noise and confusion in their homes, Hanscombe, Haworth, Davis, Jaffee, and Plomin (2010) reported that identical twins reared together do not perceive their environment identically, further emphasizing the importance of understanding of family dysfunction through children's representation rather than parent report.

The current findings also provide support for the construct and predictive validity of the family drawing paradigm as a potential measure of child representation of family functioning. The family drawing paradigm may be a useful tool for gaining insight into children's perceptions of their caregiving experiences and how these experiences are internalized throughout early development. The construct and predictive validity of this measure is also supported by its correlations with household chaos and early caregiving behaviors.

The major findings from this study highlight the importance of the household disorganization dimension of chaos as a proximal experience of young children in predicting children's representation of family dysfunction even in the presence of important covariates such as maternal depressive symptoms, child gender, race, temperament, and cognitive ability. These findings add further weight to previous research demonstrating links between household chaos and children's development and the role that parenting plays in these associations (e.g., Vernon-Feagans et al., 2012). That household disorganization, and not instability, was found to be a significant pathway to children's representations highlights that the proximal effects of daily disorganization outweigh the effects of periodic instability overtime. Excessive noise and crowding create stressful situations that could diminish opportunities for more positive and sustained interactions between the child and the environment, which serves as a primary mechanism of development (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998).

Excessive noise and overcrowding can interfere with concentration and often lead to greater expenditure of effort to maintain focus and attention. Noise may cause fatigue and has been linked to elevated negative affect and mood, including irritability and hostility (Evans, Bullinger, & Hygge, 1998) which may disrupt opportunities for more positive interactions between parents and children. The stress from the excessive noise and overcrowding can spill over into parenting processes such that mothers may have less energy and attention for their children and may be more irritated and hostile towards them.

By using both dimensions of parenting across multiple time points, our study provided a more refined look at the nature of the relation between household chaos and children's representations of family dysfunction and the mediating effects of parenting. To our knowledge, this study was the first to find that parenting behaviors mediate the associations between household chaos and child representation of family dysfunction. The indirect pathway from household disorganization to child representations through harsh intrusive parenting confirms prior findings suggesting that the stress of chaos can diminish parents' ability to engage productively with their children (Evans, 2004; Evans, Wells, & Moch, 2003). This finding is in keeping with the larger literature using the Bioecological model that suggests that one pathway by which the broader family context influences children's development is through proximal parent-child dynamics (e.g., Evans et al., 1998; Hardaway et al., 2012). Mothers in chaotic home environments must compete with excessive noise and overcrowding while interacting with their young children and may adopt harsher parenting strategies as prior studies have suggested (Coldwell et al., 2006).

In addition, this study suggests that there are two distinct pathways to child representation of family dysfunction, with both working through harsh intrusive parenting. One pathway was from household income to disorganization to harsh intrusive parenting to children's family drawings; while the second pathway was from disorganization to harsh intrusive parenting to children's family drawings. That income is related to parenting is in keeping with prior research that links economic hardship and less optimal caregiving (Conger et al., 2010; McLoyd, 1998). That disorganization has unique associations with children's family drawings above and beyond the effects of household income highlights the importance of examining more proximal family processes (i.e., parent-child relationships) to better understand the impact of household chaos on children's development. Additional research supports this finding. In a study of 676 3rd grade children, most of whom were African American, chaos added significant variance to the model above and beyond SES and neighborhood characteristics for parent-reported behavior problems and, to a limited extent, teacher-reported behavior problems, accounting for a total of approximately 20% of the variance (Dumas et al., 2005). In addition, Coldwell et al. (2006) reported that household chaos was predictive of older children's problem behaviors over and above parenting in 105 two-parent families, although they did not examine SES. Using mother and father reports of chaos and children's behavior, they found that chaos predicted children's problem behavior beyond gender, age, and positive or negative parenting. An interaction

between chaos and parenting indicated that high chaos exacerbated poor parenting in predicting outcomes.

Finding that both significant pathways are mediated through harsh intrusive parenting, as compared to sensitive parenting, suggests that the overwhelming stress of chaos disorganization can diminish parents' ability to engage productively with their children. The exposure to noise, crowding, and a lack of organization may increase parents' fatigue or tension, which would increase their tendency to respond to children in more negative ways (Evans et al., 1999). Although some of the chaos indicators are less under the control of mothers (e.g., excessive neighborhood noise), there are some possible ways mothers might reduce chaos from disorganization in the home. For example, parent educators could encourage mothers to reduce the ambient noise in the home by reducing the number of hours the TV is on in the home.

There are several limitations of the current analysis that merit consideration. First, in spite of the relatively diverse nature of our sample, the findings of this study only generalize to families living in rural communities, and, as such, warrants additional research and replication in socioeconomically diverse samples. Second, this report used cognitive development of the child at age 36 months due to availability of data. As children age and their cognitive capabilities expand, so might their ability to understand their social worlds. Thus, using a concurrent assessment of children's cognitive ability may provide a more nuanced understanding of their family drawings. Third, there are additional constructs related to chaos that were not measured in the present study. For example, family routines such as sleeping and eating schedules were not used. Prior research suggests that these types of routines may be important for children's development (Johnson et al., 2008; Roy, Tubbs, & Burton, 2004). These types of measures were not used in this study in an effort to not rely on parent subjective ratings and because many routines, like sleeping and eating schedules, are not stabilized for most young children until toddlerhood. In addition, the "Draw a picture of your family" task from which our outcome measure was derived may have been interpreted by some children quite literally: to draw their family and nothing more, while others might draw pets, activities, and locations (background) for the family. The drawing task was part of a larger battery of assessments, and it is possible that drawings from different contexts or the use of multiple pictures or drawings may have resulted in different findings, however, there is good validity data for the family drawing as it was administered.

Importantly, in our conceptualization of this study, our hypothesis was that cumulative chaos would lead to harsher, intrusive parenting. However, it may also be the case that mothers who use harsher/more intrusive parenting behaviors also contribute to greater family chaos. It seems likely that the direction of the effects is bidirectional or transactional and this possibility deserves more attention by researchers to tease apart these mechanisms.

Implications and future directions

The current findings suggest that the family drawing paradigm may have useful implications in clinical and diagnostic settings. Given the predictive validity of the family drawing paradigm as a potential measure of child representation of family functioning, practitioners may find children's drawings as useful tools for gaining insight into children's perceptions of their caregiving experiences and how these experiences are internalized throughout early development. This may be especially true in accessing the more subjective, personal aspects of working models of self and relationships, especially in middle childhood when play and narrative-communication tasks may not be developmentally appropriate. The findings from this study suggest that children's family drawings provide a window into children's understanding of their experiences and may provide the clinician additional insight into the etiology of problems and their likely trajectory while revealing opportunities for intervention.

With regards to chaos and child functioning, it may be fruitful from a practitioner's standpoint to determine whether there are particular periods in children's lives when chaos and other family processes are more or less consequential for children's development and will allow for more targeted interventions.

In the current study, disorganization was important even in the presence of poverty, suggesting that it is somewhat independent of poverty in predicting child representation of family dysfunction in this sample of mostly poor families (Bronfenbrenner & Evans, 2000; Evans et al., 2005). Given that we found two indirect pathways to child functioning through chaos and disorganization, researchers should continue to develop and refine methods of assessment of household disorganization. Efforts also should be made to more comprehensively assess children's actual exposure to chaos. For example, some children may experience multiple chaotic environments (e.g., at home, at school, at childcare). Further, other situational factors may moderate children's exposure, such as whether or not they have a space to "escape" from chaotic conditions (e.g., a private bedroom; Wachs & Gruen, 1982). In addition, it is not known whether there are thresholds at, or above, which, exposure to chaos becomes detrimental, and, if so, whether these thresholds differ across individuals. Additional investigations including multiple outcomes and examining moderating factors will help elucidate the answers to these important questions.

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