



## Early exposure to environmental chaos and children's physical and mental health<sup>☆</sup>



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### ABSTRACT

Environmental chaos has been proposed as a central influence impeding children's health and development, with the potential for particularly pernicious effects during the earliest years when children are most susceptible to environmental insults. This study evaluated a high-risk sample, following 495 low-income children living in poor urban neighborhoods from infancy to age 6. Longitudinal multilevel models tested the main tenets of the ecobiodevelopmental theory, finding that: (1) numerous distinct domains of environmental chaos were associated with children's physical and mental health outcomes, including housing disorder, neighborhood disorder, and relationship instability, with no significant results for residential instability; (2) different patterns emerged in relation to the timing of exposure to chaos, with more proximal exposure most strongly associated with children's functioning; and (3) the intensity of chaos also was a robust predictor of child functioning. Contrary to expectations, neither biological vulnerability (proxied through low birth weight status), maternal sensitivity, nor maternal distress moderated the role of chaos. Rather, maternal psychological distress functioned as a pathway through which environmental chaos was associated with children's functioning.

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### Introduction

In recent years, American families have experienced growing economic instability, heightened volatility in the housing market, and greater flux and variability in family structure. For children and families, these forces translate into more chaos and uncertainty in their day-to-day lives with increasing disorder and instability in families, homes, and communities (Annie E. Casey Foundation, 2011). These stressors, which are often conceptualized in the literature as environmental chaos (Bronfenbrenner & Evans, 2000), confer strain on children and parents and undermine healthy functioning (Deater-Deckard et al., 2009; Evans, Boxhill, & Pinkava, 2008). Numerous studies have identified links between environmental chaos and children's physical, socio-emotional, and cognitive well-being (Coldwell, Pike, & Dunn,

2006; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005; Vernon-Feagans, Garrett-Peters, Willoughby, Mills-Koonce, & The Family Life Project Key Investigators, 2012). Research has shown that experiences of environmental chaos are especially common among low-income families, with economic, housing, and relational insecurities both contributing to and being affected by poverty (Deater-Deckard et al., 2009; Evans et al., 2005; Newman, 2008). Nonetheless, notable variation exists among low-income families, and it is essential to increase understanding of individual differences in order to delineate factors supporting children's resilient and successful functioning in the face of economic and social risk (Mendez, Fantuzzo, & Cicchetti, 2002; Vernon-Feagans et al., 2012; Vernon-Feagans, Cox, & The Family Life Project Key Investigators, 2013).

Although there is a substantial body of literature linking chaotic experiences to negative outcomes for children, our current understanding of the role of chaos in children's lives is constrained by a lack of conceptual and operational clarity regarding the definition of chaos. There also remain questions regarding when, for whom, and under what conditions environmental chaos is most detrimental to children's healthy development. In this research, we draw on Shonkoff's (2010; Shonkoff & Garner, 2012) ecobiodevelopmental theory on the implications of pernicious early experiences to build a rich, theoretically anchored conceptualization of environmental chaos. The ecobiodevelopmental theory has five key components.

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Below we briefly discuss each of the five components, review relevant empirical support, and identify enduring questions.

### *Conceptualizing and operationalizing environmental chaos*

First, the ecobiodevelopmental model (Shonkoff, 2010; Shonkoff & Garner, 2012) proposes that different domains of environmental chaos, including environmental disorder (a lack of safety and supportiveness in the physical and built environments surrounding children) and environmental instability (a lack of consistency and stability in primary caregivers and contexts) negatively affect children's healthy development. Extant empirical literature has employed a broad range of operationalizations of environmental chaos, ranging from broad composite measures of household chaos to narrow conceptualizations focusing on a specific arena. For example, a number of studies have used composite measures such as the Confusion, Hubbub, and Order Scale (Matheny, Wachs, Ludwig, & Phillips, 1995) which captures in-home family processes, generally characterized as disorder, like "being able to hear yourself think" and "usually able to stay on top of things." Studies employing this scale have linked higher levels of household chaos with children's heightened behavior problems (Coldwell et al., 2006; Supplee, Unikel, & Shaw, 2007), lower IQ (Deater-Deckard et al., 2009), and lower early literacy skills (Johnson, Martin, Brooks-Gunn, & Petrill, 2008). Other composite measures of chaos that broadly capture household disorder through a lack of organization and presence of ambient noise have been linked with aggressive behaviors, attention problems (Martin, Razza, & Brooks-Gunn, 2012) and inhibited language development (Martin et al., 2012; Vernon-Feagans et al., 2012) among young children, as well as heightened psychological distress in youth (Evans et al., 2005).

Other studies have focused on more distinct aspects of environmental disorder, such as unsafe housing conditions, maintenance deficiencies, pollution, and neighborhood crime (Evans & Kim, 2012, 2013; Roche & Leventhal, 2009; Schofield et al., 2011; Vernon-Feagans et al., 2012), arguing for the importance of safety and order at both household and neighborhood levels. A recent study of low-income urban families using the same dataset as the current study but focused on older children, for example, identified housing disorder as the most potent housing feature associated with children's emotional and behavioral problems (Coley, Leventhal, Lynch, & Kull, 2013). Neighborhood disorder has also been associated with less advanced behavioral and cognitive skills among young children in studies using a variety of maternal, observational, and census measures of neighborhood disorder (Caughy & O'Campo, 2006; Farver, Natera, & Frosch, 1999; Jackson, 2003; Kohen, Leventhal, Dahinten, & McIntosh, 2008; Supplee et al., 2007; Vaden-Kiernan et al., 2010). Little past research has assessed both housing and neighborhood disorder concurrently to identify their unique contributions to children's development. Since poor quality housing is often located in neighborhoods with greater poverty, crime, and social disorder (Coley, Kull, Leventhal, & Lynch, 2014), studies that attend to only one of these disordered contexts may suffer from unmeasured heterogeneity bias, overestimating the effects of a particular domain of disorder in children's lives.

Turning to instability as a domain of environmental chaos, similarly, limited research has considered comprehensive conceptualizations of instability. The most-studied types of instability for young children include caregiver instability (operationalized as parental relationship transitions) and residential instability. Research has found associations between maternal relationship instability (movements in or out of marriage or cohabitation) and young children's behavior problems in both low-income and economically diverse samples of families (Ackerman, Brown, D'Eramo, & Izard, 2002; Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999;

Cavanagh & Huston, 2006; Fomby & Cherlin, 2007; Magnuson & Berger, 2009; Osborne & McLanahan, 2007), with some evidence of links to emotional problems as well, as found in research with older children from the same sample as the current study (Bachman, Coley, & Carrano, 2011). Work on residential instability has delineated associations with worse physical health outcomes (Busaker & Kasehagen, 2012; Cutts et al., 2011; Kamp Dush, Schmeer, & Taylor, 2013) as well as heightened emotional and behavioral problems among young children, as found in research with older children from the current study as well as other datasets (Coley et al., 2013; Ziol-Guest & McKenna, 2014). As with environmental disorder, evidence suggests that aspects of environmental instability are correlated within families (Kull, Coley, & Lynch, submitted for publication). Thus it is important for research to concurrently consider the role of multiple aspects of instability in children's lives.

Together, recent research has shown empirical support for the importance of household and neighborhood disorder as well as residential and caregiver instability, but little work has assessed these constructs simultaneously. As an important exception, in a study of low-income rural children from birth to age three, Vernon-Feagans and colleagues (2012) factor analyzed a broad range of environmental chaos measures, delineating one domain describing physical disorder and disorganization within the household and neighborhood (e.g., the presence of ambient household and neighborhood noise, crowded and unclean housing) and a second domain capturing instability in residence and family composition (residential moves, primary and secondary caregiver changes). This work found that environmental disorder but not instability was predictive of young children's language skills; other important arenas of child functioning such as physical and mental health were not addressed.

### *Developmental timing of environmental chaos*

The second tenet of the ecobiodevelopmental model contends that the developmental timing of chaotic experiences matters. Infancy represents an exceptionally sensitive period of development characterized by vulnerability to environmental insults (Shonkoff, 2010; Shonkoff & Garner, 2012). Experiences of environmental chaos early in life have the capacity to disrupt the processes involved in young children's stress reactivity, neural circuitry, physiological regulation, as well as metabolic, cardiovascular, and immunological systems, in turn impacting short and long-term health and development (Blair, 2002; Blair et al., 2011; Meaney, 2010; Shonkoff & Garner, 2012). Recent research has focused on links between chaos and psychological functioning in adolescents (Evans, Saltzman, & Cooperman, 2001; Evans et al., 2005), but there is little work that attends to nuanced associations between the developmental timing of chaotic experiences and young children's functioning. Research on a variety of environmental chaos domains has failed to identify stronger effects of instability during early childhood than during later childhood, although few studies have included infants (Bachman et al., 2011; Coley et al., 2013; Fomby & Cherlin, 2007; Supplee et al., 2007). Thus, empirical support for the importance of developmental timing in the role of environmental chaos is limited.

### *The intensity of chaos*

In addition to the domains and timing of chaos, ecobiodevelopmental theory argues that the intensity of environmental chaos is important – that adverse environmental experiences which are deep, prolonged, and extensive are more detrimental to children's health and well-being than unfavorable experiences that are targeted and short-term (Shonkoff, 2010; Shonkoff & Garner, 2012). Yet most extant research measures environmental chaos at one

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