Chaos and Its Influence on Children's Development
An Ecological Perspective

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Chaos and the Macrosetting: The Role of Poverty and Socioeconomic Status

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You can never plan a week or a day ahead… one minute you’re fine and the next you just can’t deal.
—Low-income mother describing daily life
(Roy, Tubbs, & Burton, 2004, p. 174)

There are many reasons why the lives of children from low-income households are more chaotic than are those from middle- and high-income households. Low-income parents suffer from a plethora of physical and social stressors. Poor parents juggle overlapping time obligations and have fewer resources than do wealthier parents to deal with the multitude of demands and obligations they face. Low-income parents are less likely to have a dependable car; they cannot afford reliable flexible child care or after-school care; their children are enrolled less often in structured child or youth programs; and low-income parents are less likely to have a partner, who could share household management and parenting responsibilities. Residential and school relocations, which erode social networks, are more common, and family disruptions and turmoil are more frequent among low-income families (Evans, 2004). In this chapter we document linkages between poverty and low socioeconomic status (SES) and chaos, review studies examining chaos as a mediator of poverty’s impacts on children, and offer preliminary thoughts about why chaos is problematic for children’s development.

Chaos, Poverty, and Socioeconomic Status

Components of chaos associated with poverty and SES include household crowding, noise levels, household routines and rituals, residential and school relocation, and parental partner instability. For each of these components of chaos, we have constructed a summary table. These tables are not included because of length restrictions but can be found at http://www.macsu.ucsf.edu/Research/Social%20Environment/notebook/chaos.html. Chaos is operationalized in a few studies as a composite variable, with these results summarized in Table 7. Herein
we characterize the overall direction and strength of relations among various indices of chaos and poverty and SES. Before we describe the evidence linking chaos to income or SES, however, it is important to emphasize that chaos is not equivalent to income or SES. In almost every study of chaos and child development, as indicated in chapters 3, 4, 6, 9, 10, and 11 of this volume as well as by the data described in this chapter, statistically significant associations between chaos and child outcomes remain with statistical controls for income or SES. In other words, the impacts of chaos on child development cannot be explained by income or class. Furthermore, as we show in the Chaos as a Mechanism for Social Class Effects on Human Development section later in this chapter, evidence for a pathway of SES → chaos → child development includes data showing that the chaos → child development link is significant when SES is in the model.

Because most research on chaos has focused on its impact on child development, investigators have used various means to minimize the potential contaminating role of income or SES in these relationships. In many cases this has likely led to downwardly biased estimates of the role of income or SES in chaos. The most typical analytic approach has been to incorporate SES statistical controls in analyses. Many of these same investigators have also tried to minimize variability in SES or income in their samples to better isolate the effects of chaos. Moreover, many chaos and child development studies have truncated variance in income or class because of sampling restrictions. Only about 20% of American families with children are poor, plus they are more difficult to recruit and retain in empirical studies. Thus, low-income families are underrepresented in social science research, including work on chaos. Finally, nearly all of the data come from the United States or Western Europe, where the potential range of chaos is dramatically less than that found in economically underdeveloped societies. Each of these limitations downwardly biases estimates of chaos sequelae of SES. On the other hand, self-selection and other omitted variables could produce spuriously high chaos–SES associations. Because most of the evidence on chaos and child development emanates from cross-sectional studies, this concern is applicable. One or more predisposing conditions (e.g., maternal depression) could produce inflated chaos–SES relations. It is noteworthy that most psychological research on chaos and child development has focused on selection bias and other factors that could inflate the association (see chap. 10) even though Type II errors are equally if not more salient. The following subsections summarize the evidence for ecological covariation among each of the constituent parts of chaos.

Crowding

Crowding contributes to chaotic living and school settings. Crowded environments are overstimulating, confusing, unpredictable, and uncontrollable. The salient index of crowding is people per room (Evans, 2006). High interior density is problematic because it interferes with the regulation of social interaction. Most child crowding studies show associations between crowding and outcomes with statistical controls for SES (Evans, 2001, 2006). There is a consistent
modest correlation between crowding and poverty status. In studies using either income or poverty status the correlations range from a low of .32 (Light, 1973) to a high of .53 (Evans, Lepore, Shejwal, & Palsane, 1998), with a mean correlation of .44 (see Table 1). The Evans study examined lower and working-class families in India, whereas the Light study examined a large sample of U.S. households. When categorical outcomes (e.g., less than or greater than one person per room) are used, the percentage difference ranges from 5% (Federman et al., 1996) to 30% (Davie, Butler, & Goldstein, 1972), with a mean differential of 16.3% between poor and not-poor households (see Table 1). None of the studies found contradictory data. Low-income and low-SES families live under more crowded conditions.

*Noise*

Noise is measured by decibels, a logarithmic scale of sound intensity. A 10-decibel increase doubles perceived loudness. Common noise sources include transportation sources, especially airplanes and vehicular traffic, activities of other people, music, and various appliances. Noise elevates physiological arousal as well as interferes with relaxation and sleep (Cohen, Evans, Stokols, & Krantz, 1986). It also disrupts concentration and causes greater effort to maintain attention. The most robust adverse developmental outcome associated with chronic noise is reading deficits (Evans & Hygge, 2007). Noise can also produce fatigue and negative affect, including irritability and hostility (Evans, 2001, 2006). Nearly all of the noise studies incorporate statistical controls for SES, and a few longitudinal studies show effects of similar magnitude.

Studies of noise and SES relative to crowding are fewer, but they converge on a link between SES and noise exposure (see Table 2). Among a restricted range of lower-middle- and middle-income families, noise levels correlated –.14 with income (Heft, 1979), whereas a larger, more representative study of urban households found a correlation of –.61 between income and community noise levels (Environmental Protection Agency, 1977). In studies comparing noise exposures between various groups by income, poor children are exposed to between 5 and 10 more decibels on average (Evans & English, 2002; Haines, Stansfeld, Head, & Job, 2002).

*Routines and Rituals*

One of the key elements of stability in children’s lives is the degree of structure and predictability in daily routines. Routines convey what needs to be done by whom and occur repeatedly over time (Fiese, 2006; see also chap. 4, this volume). Rituals happen less often and convey through practice and symbol a sense of community and belonging. Households with more structured and regular daily activities engage in more family rituals.

Routines tend to be positively related to SES, with correlations ranging from –.15 (Crouter, Head, McHale, & Tucker, 2004) to .47 (Boyce et al., 1977) for income, with an average correlation between income and routines of \( r = .12 \)
(see Table 3). One reason for the high variability in SES correlates of routines and rituals is sampling restrictions. Samples with greater heterogeneity of income uncover higher correlations between SES and routines and rituals. For example, in a nationally representative sample of nearly 30,000 households, Bradley, Corwyn, McAdoo, and Garcia-Coll (2001) found that families below the poverty line were about 15% less likely than other families to have a regular mealtime routine in their home. In another large, heterogeneous sample, 44% of families headed by a high school dropout had regular meal, nap, and bedtime routines for their infants and toddlers, whereas 58% of parents who were high school graduates maintained such routines (Britto, Fuligni, & Brooks-Gunn, 2002). Very few studies have examined rituals and SES, so we cannot speak with confidence about the role of SES and child exposure to rituals.

Some parents undoubtedly do their best to maintain routines and rituals in the face of poverty. Although they benefit children, such efforts may exact costs for caregivers. For example, adolescent adherence to medical regimens for asthma does not vary with social class, but lower SES parents experience greater burden to maintain the level of desired asthmatic care for their teenage children compared with more advantaged parents (Fiese, Wamboldt, & Anbar, 2005). Flexibility and support may be in relatively short supply for parents with fewer economic or SES resources to draw on.

Changes in parental work hours, particularly if frequent or unpredictable, can make it difficult to maintain structure and routines in daily life. Opportunities to schedule other activities for children, particularly when they are young, that depend on parental involvement for transportation are also more challenging if parental work schedules are unstable (see chaps. 2 and 12). Two of the hallmarks of lower wage jobs, at least in the United States, are less regular schedules and change. In a nationally representative sample of 50,000 American households, about 10% of the total workforce have work schedules that vary weekly. Such jobs are 27% more likely to occur among high school dropouts (Goldin, 2001). Among all American workers, 26% of high school dropouts worked nonday shifts or variable schedules compared with 10% of college graduates (Presser, 2003). Forty percent of female heads of households with a child under 14 worked nonstandard hours or on weekends, or both, compared with 31% of their counterparts with a partner in the house (Presser, 2003). Data are not presented by income, but American laborers are 47% more likely to work variable hours on a weekly basis compared with those with other types of occupation. Professionals, by comparison, are 35% less likely to work variable hours (Goldin, 2001). In a study of 900 women who had worked from the time their child was born until their child was 3 years old, 69% of low-income mothers had worked at some time on a nontraditional schedule compared with 55% of mothers above the poverty line (Han, 2005). Lower wage American workers are also much more likely to work during evening or night times compared with typical daytime work hours (Hamermesh, 1999).

Residential Relocation

A major contributor to chaos in children’s lives is changes in home or school location. If relocations are frequent, children may become reluctant to establish
new friendships or to rely on adults for guidance and support, knowing that they may soon have to break those ties and start over again (Adam, 2004). When school changes occur, children may also be confronted with unfamiliar scholastic demands in addition to changes in peers and teachers.

Low-income children are more apt to change residences (see Table 4). In a 1988 national survey of more than 10,000 American schoolchildren between 1st and 12th grade, 39% of children had moved three or more times. Of these children, 48% were from families below the poverty line, whereas 37% were from families above the poverty line (Simpson & Fowler, 1994). Examining children ages 3 to 17 from that same data set, Long (1992) noted that children living below the poverty line were 2.4 times more likely than their nonpoor counterparts to move more than the average number of times. Census data on residential locations reveal that 24% of households below the poverty line moved between 2002 and 2003, whereas only 13% of nonpoor families relocated during that same year (U.S. Census, 2004). In a Canadian national sample, the difference in family income between 5- to 11-year-olds who had never relocated and children in the same age range who had located three or more times was greater than $10,000 (Kohen, Hertzman, & Wiens, 1998). A U.S. national study of high-frequency moves during childhood (six or more relocations) found that nearly twice as many low-income children as nonpoor children had moved frequently (Wood, Halfon, Scarlata, Newacheck, & Nessim, 1993). One aspect of residential relocation that has not been well documented is the extent of forced relocation or eviction. Two studies, both with modest-sized samples, revealed that families below the poverty line are 3 to 4 times more likely to move involuntarily than are those above the poverty line (Federman et al., 1996; Mayer & Jencks, 1989). See chapters 8 and 15 of this volume for more discussion on involuntary relocation and children's welfare.

**School Relocations**

Data on school relocations have to be considered carefully because some transitions are normative (e.g., elementary to middle school), whereas changes within one type of school are not. See Table 5 for a summary of SES and school relocation studies. The largest study of school relocations, conducted by the U.S. General Accounting Office (1994), looked at school changes between first and third grade. Three times as many low-income children (30%) had moved three or more times during this period compared with 10% of those who were not poor. Canadian national data on 5- to 11-year-olds found that children who had been to three or more schools were from households with nearly $20,000 less annual income compared with children who never changed schools (Kohen et al., 1998). Teachers, like pupils, also relocate and are more likely to do so if they work in a low-income school. Rutter et al. (1974), for example, documented 43% versus 26% teacher turnover rates in lower social class schools compared with working-class schools in London. In the United States the turnover rate of teachers in public schools is about 50% higher in low-income relative to middle-income schools (15.2% vs. 10% turnover rates; Ingersoll, 2001).
Maternal Partner Change

Family turmoil associated with poverty often leads to dissolution of romantic partnerships. Changes in household composition, particularly among adults with whom young children develop attachments, are clearly highly disruptive for children. The levels of divorce and changes in parental partners are strongly linked to SES (see Table 6). For example, in the United States, the divorce rate is almost 5 times higher in the lowest income quintile (25.4%) than it is among the upper income quintile for households with children (5.7%; Evans, 2004). Similar findings have been uncovered in U.K. national surveys as well (Kiernan & Mueller, 1999; Reid, 1989). Between 1992 and 1995, in a national sample of British adults the odds of first marriage dissolution were doubled if before the marriage either partner had received welfare and tripled if either partner had been unemployed prior to the marriage (Kiernan & Mueller, 1999). In a study of over 2,000 American children, the percentage of 3-year-olds whose mother had experienced three or more partner changes during the child's lifetime was more than double for those living below versus above the poverty line (Osborne & McLanahan, 2007).

Composite Indices

Some studies have used composite indices of chaos that do not disaggregate specific components of the measures. The most common composite index is CHAOS (Confusion, Hubbub, and Order Scale; Matheny, Wachs, Ludwig, & Phillips, 1995), which contains parental ratings of noise, confusion, crowding, and hectic pace in the household. A range of relations are stronger for SES heterogeneous samples (see Table 7). The average correlation between income and composite indices of chaos is .26, ranging from .09 (Dumas et al., 2005) to .40 (Marcynyszyn, Evans, & Eckenrode, 2008), in families with some variance in income. Households with lower levels of SES rather than income are also more chaotic, with an average correlation of .20 and a range of .02 (Marcynyszyn et al., 2008) to .28 (Dumas et al., 2005; Pike, Iervolino, Elev, Price, & Plomin, 2006). In addition, children below the poverty line are more than 4 times as likely (13%) to experience turbulence in their families than are those 3 or more times above the poverty line (3%; Moore, Vandivere, & Ehrle, 2000). Turbulence is a composite index indicative of residential, school, or parental job changes plus serious illness in the immediate family.

Chaos as a Mechanism for Social Class Effects on Human Development

We have shown that poverty and low SES are associated with higher levels of chaos. Moreover, many of the chapters in this volume document adverse effects of chaotic living conditions on children's cognitive, socioemotional, and physical well-being. Most of these studies also show that the effects of chaos on child outcomes are independent of SES. Recall that most studies of chaos statistically
control for SES or use homogeneous samples of all low-income or all middle-income families. This pattern of interrelationships suggests the potential for chaotic environments to function as underlying mechanisms, conveying some of the covariation between income or SES and children's development.

We are aware of only two research programs that have directly examined the mediational pathway income (SES) → chaos → child development. Brody and Flor (1997) found that perceived financial hardship was associated with greater externalization and internalization symptoms as well as lower cognitive development among 6- to 9-year-old, low-income African American children. Family routines as assessed by the Family Routine Index (Jensen, James, Boyce, & Hartnett, 1983) conveyed some of these effects. Both the direct and indirect effects of perceived financial strain on children's cognitive development and well-being were significant. Children in households with greater financial burden experienced more chaotic household routines, which in turn partially mediated some of the ill effects of financial strain on their socioemotional and cognitive development.

Evans and English (2002) tested the mediating role of multiple stressor exposure in the link between poverty and developmental outcomes. Multiple stressor exposure was operationalized by coding six continuous indicators of risk into categorical codes of "risk" and "not at risk." The continuous measures of risk included residential noise and crowding, housing problems, family turmoil, child separation from parents, and exposure to violence. For each stressor, children exposed to greater than 1 standard deviation above the mean for the particular stressor were defined as being at risk. Approximately half of the sample of 8- to 10-year-old children lived in households at or below the federal poverty line, and half were from middle-income families. Multiple stressor exposure consisted of the sum (0–6) of the six dichotomous exposure metrics. Relations between poverty and elevated resting blood pressure and overnight stress hormones (cortisol and epinephrine) of low- relative to middle-income children were mediated by multiple stressor exposure. For psychological distress, partial mediation was uncovered, indicating both direct and indirect effects of poverty on this outcome. For self-regulatory behavior (Mischel's delay of gratification paradigm; Mischel, Shoda, & Rodriguez, 1989), the pattern of mediation more closely matched physiological stress outcomes indicative of full mediation. In a more recent study, Evans and Kim (2007) found prospective, longitudinal evidence that multiple stressor exposure mediated linkages between poverty and physiological stress in this same sample, 4 years later during early adolescence. Evans Gonnenna, Marcynyszyn, Gentile, and Salpekar (2005) investigated the role of chaos in their longitudinal sample as well. They modified the original CHAOS (Matheny et al., 1995) slightly by adding measures of structure and routines. This modified CHAOS fully mediated the links between income and psychological distress, self-regulatory behavior, and learned helplessness during early adolescence, residualizing earlier measures of the same set of outcomes. The latter measure consisted of persistence on a challenging geometric puzzle.

Both Brody's and Evans's respective research programs provide preliminary evidence that some of the covariation between low-income and adverse socioemotional outcomes, including psychological distress, learned helplessness,
and self-regulatory behavior, is mediated by higher levels of chaos in low-income households compared with middle-income families. Moreover, these effects help explain some of the well-documented negative outcomes of exposure to poverty or low SES. A strength of this pattern of results is multimethodological indices of socioemotional development in conjunction with both cross-sectional and longitudinal evidence. Moreover, the findings from these two research programs are supplemented by Evans's work showing parallel mediational results for physiological markers of stress. Finally, there are several replications of the poverty → chaos → socioemotional outcomes pathway across the two different research programs. An important limitation of both programs of research is the samples. Evans's sample is modest in size, nearly all Caucasian, with children living in rural areas of upstate New York. Brody's sample consists of African American, predominantly low-income families headed by a single parent, living in rural Georgia.

In sum, chaos is not simply a marker or surrogate for poverty or low SES. If it were, analyses of developmental sequelae of chaos would not be significant when income or SES are incorporated as statistical controls. Yet many studies, as reviewed in chapters 3, 4, 6, 9, 10, and 11, plus data from the studies described in this chapter reveal that statistically significant associations between chaos and child outcomes maintain with statistical controls for income or SES. Moreover, the mediational results from the research programs of Brody and of Evans also show that chaos predicts developmental outcomes, statistically controlling for income or SES. That is, chaos mediates the impacts of income (SES) on child outcomes rather than the other way around (MacKinnon, 2008). The covariation between chaos and child development cannot be explained by income or SES, but some of the covariation between income or SES and child development is mediated by chaos.

Chaos and Human Development

In this section we offer preliminary ideas about why chaos is harmful to children's development. Bronfenbrenner's bioecological model of human development provides a valuable theoretical framework to address this question. One of the key elements of the bioecological model is proximal process. Proximal process involves a transfer of energy between the developing human being and the persons, objects, and symbols in the immediate environment (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998). For proximal processes to be effective they must take place regularly, over an extended period, and involve progressively more complex, reciprocal interactions between the developing human and his or her immediate surroundings (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998). A fundamental reason why chaos is harmful to children is because it interferes with effective proximal processes. The predictability and sustained nature of increasingly complex interactions become more difficult to maintain in chaotic households. High levels of background stimulation (noise, crowding) and irregular and unstructured activities and schedules in conjunction with changes in familiar social and physical environments (adult household composition, residential or school changes) do not comport
with proximal processes. Chaos shortens the duration of exchanges of energy between the developing child and his or her immediate surroundings. The child is less able to count on or predict that certain types of interactions will happen. At a most basic level, individuals cannot develop socially cohesive, meaningful relationships with people unless they see them regularly and can count on them being around. Regular interaction with family and friends is critical for the development and maintenance of healthy social networks.

Not only are proximal processes less likely to occur in chaotic settings, but children and their caregivers living under chaotic conditions may respond to their surroundings in ways that exacerbate aversive consequences of chaos. Warm and responsive familial interactions suffer under chaotic living conditions, which in turn could undermine the development and maintenance of secure attachment. Crowding and noise, for example, each interfere with the development and maintenance of warm, supportive parent-child interactions (Evans, 2001, 2006; Wachs & Corapci, 2003). Parents in both higher density and noisier homes are more socially withdrawn from their children, less patient with them, and less responsive. They also are less likely to speak with their children. In a research program on crowding, Evans and Lepore have shown in both the laboratory and the field that high-density living conditions interfere with the development of socially supportive relationships among adults. Evidence includes cross-sectional and prospective, longitudinal data in both the field and the laboratory (Evans, Palsane, Lepore, & Martin, 1989; Evans & Lepore, 1993; Evans, Rhee, Forbes, Allen, & Lepore, 2000; Lepore, Evans, & Schneider, 1991). Less social cohesion and more social conflict have been shown in higher density homes of elementary-school-age children as well (Evans et al., 1998). All of these crowding studies incorporated statistical controls for SES. Several studies in both the field and the laboratory have shown that noise leads to less altruism among adults (Cohen & Spacapan, 1984; Evans & Cohen, 2004). Composite indices of chaos such as Matheny's CHAOS have also been linked to less responsive parenting (Corapci & Wachs, 2002; Matheny et al., 1995) as well as less parental warmth and harsher, more hostile parent-child interactions (Coldwell, Pike, & Dunn, 2006). Composite indices of instability (e.g., residential change, maternal partner change) are also associated with greater family conflict (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999) as well as parenting difficulties (e.g., rejection, overcontrolling behavior; Forman & Davies, 2003). Similar findings have been found for maternal romantic partner changes and parenting (Martinez & Forgatch, 2002). However, not only parents are affected by chaos. Residential instability can also compromise sibling relationships. Head Start children who moved more often had more conflicted relationships with their older siblings (Stoneman, Brody, Churchill, & Winn, 1999). Changes in day-care facilities are positively correlated with more restrictive parenting coupled with less nurturing family characteristics (Howes & Stewart, 1987). When parents are overstimulated and stressed by chaotic surroundings, it may be adaptive, initially, for them to tune out or withdraw from the negative conditions. However, an unintended side effect of such withdrawal may be less engagement in proximal processes (e.g., parental responsiveness, warmth).

Lack of structure coupled with unpredictability may also have consequences for feelings of mastery and self-efficacy. It is difficult to learn that one's actions
can influence one's surroundings if many person–environment exchanges are unpredictable or uncontrollable (Evans & Stecker, 2004; White, 1959). Routines and rituals are a source of feedback from the environment about the consequences of the individual's and family's plans and expectations. Children need to know what is going to happen, when and where, and what preparations precede outcomes such as meals, religious services, and celebration of important milestones and holidays. Routines provide scaffolding to learn how to translate goals into actions (Fiese, 2006; see also chap. 4, this volume). At a more basic level, lack of structure and routine robs the developing child of fundamental building blocks of comprehension of temporal sequences and, ultimately, cause and effect (Heft, 1985). Corapci and Wachs (2002) noted a negative association between chaotic living conditions and mothers' sense of parental efficacy. Evans et al. (2005) showed in a prospective, longitudinal analysis that more chaotic living conditions predicted greater susceptibility to learned helplessness among young adolescents.

Lack of routines and structure may also undermine self-regulatory ability. It is hard enough for children to learn to manage their own behaviors and emotions; to do so against a backdrop of unpredictable and shifting physical and social circumstances asks a lot. Expectations for appropriate behaviors are reinforced by family routines and rituals (Fiese, 2006). In a sample of 6- to 9-year-olds, Brody and Flor (1997) showed that less organized and less structured daily life was negatively related to self-regulatory behavior. Both parental and teacher ratings of self-regulatory behaviors were negatively correlated with family routines. Thirteen-year-olds living in more chaotic households were rated lower in self-regulatory behavior by one of their schoolteachers (Evans et al., 2005). Chaos was evaluated by the adolescent's mother. Part of the development of self-regulatory skills presumably involves opportunities to exercise person-initiated interactions with the surrounding social and physical environment. Chaotic households may provide fewer opportunities for this to occur, with many person–environment transactions dominated by environmental demands rather than initiated by the individual (Metcalf & Mischel, 1999; Mischel & Ayduk, 2005).

Chaotic living environments can interfere with children's physical health. For example, families that maintain more structured, regular medical regimens with asthmatic children achieve better asthma control (Fiese et al., 2005). As Fiese suggested, it is possible to extend this idea beyond medication routines. Healthy eating is fostered by the planning and preparation of meals. The maintenance of exercise programs is fostered by having a regular place and time to exercise. All people, but especially children, sleep better if they have a regular bedtime routine and place to sleep. Young children need guidance and ground rules to help them learn to do homework, to read on a regular basis, and to master new skills, whether in music, art, or athletics.

In chapter 7 of this volume, Wachs described several person characteristics that appear to interact with chaos to affect development. Here we briefly note social and physical environmental conditions that could alter the developmental sequelae of chaos during early childhood. The negative relationship between harsh, unsupportive parenting and behavior problems in 6- to 8-year-old British children was exacerbated when it occurred against a backdrop of more chaotic living conditions. Households with less structure, more noise and crowding,
and more frenetic levels of activity appeared to accentuate the link between
poor parenting practices and behavioral problems during middle childhood
(Coldwell, Pike, & Dunn, 2006). Eight- to 12-year-old inner-city African Amer-
ican children who lived in households with greater routines and structure were
partially protected from the harmful impacts of daily stressors and hassles on
their psychological well-being (Kleiwer & Kung, 1998). Among first through
fifth graders whose parents were divorced, behavioral adjustment and academic
performance were enhanced by more regular bedtimes (Guidubaldi, Cleminshaw,
Perry, Nastasi, & Lightel, 1986).

Summary and Conclusions

Most developmental research focuses on the intensity or level of individual and
environmental variables and processes as they impinge on children. The study
of chaos offers a reminder that temporal qualities of organism–environment
transactions warrant more consideration (Bronfenbrenner & Evans, 2000;
Lepore, 1995; see also chap. 8, this volume). Most research on temporal dimen-
sions of environmental exposure in the realm of development has focused on
developmental timing, largely driven by biological considerations of plasticity.
The duration, frequency, regularity, and contingency of interactions between
children and their surroundings may be just as important as the level of envi-
nronmental exposures. We have argued that chaotic living conditions can inter-
fere with proximal processes that are integral to the development of healthy,
well-adjusted children. Regular, sustained, increasingly complex person–envi-
nronment interactions are more difficult to maintain against a backdrop of cha-
otic living contexts. As the chapters in this volume show, chaos can be harmful
to children’s development.

Abundant evidence shows that poverty is bad for children’s development.
One of the key and perhaps unique features of childhood poverty is the confluence
of multiple physical and social risk factors that converge among low-income
families. Not only are poorer children more likely to experience adverse living
conditions, but such conditions often cohere in a manner that undermines pre-
dictability and contingency, interferes with structure and routines, and over-
stimulates the organism. Poverty breeds chaos, which in turn harms children
and their families. To be clear, we are not arguing that chaos is equated with
poverty. As indicated earlier, most empirical studies on chaos and developmen-
tal outcomes statistically control for income or SES. Nor are we arguing that all
of the adverse impacts of poverty on children are due to chaotic living condi-
tions. Instead, we believe chaos is one of several plausible pathways through
which poverty harms children’s development.

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