

## Research Article

# The Role of Chaos in Poverty and Children's Socioemotional Adjustment

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**ABSTRACT**—*There are growing levels of chaos in the lives of American children, youth, and families. Increasingly, children grow up in households lacking in structure and routine, inundated by background stimulation from noise and crowding, and forced to contend with the frenetic pace of modern life. Although widespread, chaos does not occur randomly in the population. We document that low-income adolescents face higher levels of chaos than their more affluent counterparts and provide longitudinal evidence that some of the adverse effects of poverty on socioemotional adjustment are mediated by exposure to chaotic living conditions.*

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There is widespread evidence of growing levels of chaos in the lives of American children and youth (Bronfenbrenner, McClelland, Wethington, Moen, & Ceci, 1996). The amount of time parents can devote directly to their children is declining precipitously as more hours are spent away from home, working, commuting, and delivering children to and from child care, school, and other activities; families are less likely to share meals and other rituals together as domestic time becomes compressed; more and more children live in crowded, noisy, and substandard housing; and increasingly, family members characterize home life as hectic, unstructured, unpredictable, and, at times, simply out of control. Although such trends are ubiquitous, chaos is not evenly distributed in the population. Low-income families are more likely to face chaotic living conditions than are their middle- and upper-income counterparts. In this article, we bring together two strands of thinking about risk factors in human development to examine the role of chaos in poverty's adverse impacts on children's socioemotional adjustment.

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In the bioecological model of human development, Bronfenbrenner (Bronfenbrenner & Evans, 2000) offers the following proposition:

Throughout the life course, human development takes place through processes of progressively more complex reciprocal interactions between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment. To be effective, the interaction must occur on a fairly regular basis over extended periods of time. Such enduring forms of interaction in the immediate environment are referred to as proximal processes. (p. 117)

Chaos may interfere with the development and sustainability of proximal processes because it shortens their duration and increases interruptions, rendering exchanges of energy between the developing child and her or his surroundings less predictable. Chaos may also lower the intensity of proximal processes, given stress and fatigue in parents and other caregivers who must also contend with chaos. Frenetic activity, lack of structure, and unpredictability, in conjunction with intense background stimulation, take their toll by depriving the developing organism of the kinds of well-structured, predictable, and sustained exchanges of energy with the persons, objects, and symbols in the immediate environment critical to fostering and sustaining healthy development (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998).

Chaotic living conditions might also interfere with the development of competency, the belief that one is an effective agent in coping with one's surroundings (White, 1959). Unpredictable, nonroutine, inconsistent, and noncontingent physical and social surroundings can interfere with a sense of mastery and lead to helplessness in the developing person. Lack of routines and structure and largely intractable stimulation may also undermine the child's ability to self-regulate and manage his or her own behaviors and emotions.

Lack of routines, structure, and rituals in the home has been shown to be negatively associated with psychological adjustment in children and adolescents, parental competency ratings, satisfaction with family, and school achievement (Fiese et al., 2002; Repetti, Taylor, & Seeman, 2002). Noise, crowding, and poor housing quality are positively associated with children's psychological distress (Evans, 2001; Evans, Wells, & Moch, 2003; Wachs & Corapci, in press), as well as learned helplessness (Cohen, 1980; Evans & Stecker, 2004).

### POVERTY, CHAOS, AND SOCIOEMOTIONAL ADJUSTMENT

The immediate living environment of many low-income families can be fairly characterized as chaotic, consisting of numerous intractable and unpredictable conditions (Bronfenbrenner et al., 1996; Evans, 2004; McLoyd, 1998; Repetti et al., 2002; Sherman, 1994; Taylor, Repetti, & Seeman, 1997). Low-income children and youth face a bewildering array of suboptimal, chaotic living conditions. Relative to their more affluent counterparts, they reside in more crowded, noisier, and poorer-quality housing (Evans, 2004; Saegert & Evans, 2003). Poor children must also contend with less structure, routine, and predictability in their daily home life (Brody & Flor, 1997; Jensen, James, Boyce, & Hartnett, 1983; Matheny, Wachs, Ludwig, & Phillips, 1995). Thus, chaos is a plausible mechanism to account for the adverse impacts of poverty on socioemotional adjustment.

Numerous studies have documented negative relations between household income and psychological distress in children and adolescents (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 1997; Grant et al., 2003; Luthar, 1999; McLoyd, 1998). Grant et al. found an average effect size of .22 for internalizing symptoms and .17 for externalizing symptoms across 46 studies of children and poverty. Cross-sectional and longitudinal results converged. Moreover, the longer the duration of exposure to poverty, particularly in early childhood, the greater the adverse impact (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 1997; Luthar, 1999; McLoyd, 1998).

Although no researchers have directly investigated poverty and learned helplessness, a few have shown that lower socioeconomic status (SES) is associated with diminished mastery beliefs in children (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Battle & Rotter, 1963). Low-SES parents discourage self-directedness in their children (Kohn, 1977) and are more restrictive than high-SES parents (Luster, Rhoades, & Haas, 1989); these trends, in turn, lead to lower self-efficacy among low-SES adolescents (Whitbeck et al., 1997).

Children's self-regulatory ability may be influenced by poverty as well. Studies have shown that income is positively associated with maternal and teacher ratings of self-regulatory behavior among 6- through 9-year-olds (Brody, Flor, & Morgan Gibson, 1999) and with delay of gratification among third through fifth graders (Evans & English, 2002). Moreover, Lengua (2003) found

that self-regulatory ability in third through fifth graders buffered some of the ill effects of multiple risk exposure on psychological distress.

Three studies provide more direct evidence that chaos may account for some of the ill effects of poverty on children. In a study of inner-city 8- to 12-year-olds, Kliewer and Kluger (1998) discovered that children with regular and predictable household routines were buffered from the harmful effects of hassles on adjustment. Bresnahan and Blum (1972) studied concept formation in low- and middle-SES 7-year-olds who were asked to discover what combination of color and form was correct (e.g., triangle on green background). The children initially received either 0, 6, or 12 trials of random feedback (acquisition phase) and then received accurate, contingent feedback on each test trial. When there was no initial random feedback, low-SES children had a 15% error rate on test trials, and high-SES children had a 5% error rate. However, when noncontingent, random feedback (6 or 12 trials) was given during the acquisition phase, low- and high-SES children had the same error rate, 15%, at test. In a third investigation, parenting practices (a latent construct including mother-child harmony, maternal involvement in school, and maintenance of household routines) significantly mediated the effects of poverty on cognitive and emotional competency (Brody et al., 1999). These three studies suggest that chaos could convey some of the harm associated with childhood poverty.

### SUMMARY AND HYPOTHESES

There are growing levels of chaos in the lives of many children. Chaos, however, is not randomly distributed in the population. Low-income households experience a disproportionate share of chaotic living environments characterized by high levels of ambient stimulation (e.g., noise, crowding), minimal structure and routine, and considerable unpredictability and confusion in daily activities. Such conditions have been linked to psychological distress in the developing person. Furthermore, poverty is negatively associated with good adjustment in children.

Thus, we hypothesized that compared with middle-income adolescents, low-income adolescents experience greater chaos and manifest more socioemotional distress. Moreover, we hypothesized that exposure to chaos accounts for some of the elevation in socioemotional distress among lower-income adolescents. To assess these two hypotheses, we incorporated multiple indicators of socioemotional distress into a longitudinal study.

### METHOD

#### Participants

Three hundred thirty-nine children participated in Wave 1 of this study when they were in Grades 3 through 5 ( $M = 9.2$  years, 51% male). Three to 4 years later, 223 of these same children were

reevaluated (Wave 2) when they were in Grades 7 and 8 ( $M = 13.1$  years, 52% male). All of the families in the sample lived in rural areas in upstate New York. They were recruited from public schools, New York State Co-Operative Extension programs, and various antipoverty programs (refusal rate in Wave 1 was less than 5%). Low-income families were oversampled (53%) because this research program focuses on rural poverty. The mean income-to-needs ratio was 1.66 at Wave 1 and 2.34 at Wave 2. This ratio is an annually adjusted, per capita index, comparing household income with federal estimates of minimally required expenditures for maintaining a household. Only one child per household participated in the study. The sample was predominantly White (94%), reflecting the demographics of rural upstate New York.

The mean income-to-needs ratio at Wave 1 was 1.81 for children who remained in the sample at Wave 2 and 1.41 for those who did not participate in the second wave,  $t(338) = 3.24, p < .01$ . Children who left the sample by the time of Wave 2 data collection were disproportionately from low-income families. None of the outcome measures, however, were related to attrition.

### Procedure

All data were collected with a standardized protocol in participants' residences (see Evans, 2003, for more details).

### Chaos

Chaos was assessed with a standard scale that possesses excellent reliability and converges with independent ratings of noise, crowding, foot traffic, and confusion in the home (Matheny et al., 1995). We added items to increase coverage of routines and rituals in the home ( $\alpha$  for revised chaos scale = .77). These additional items came from the Family Ritual Questionnaire (Fiese & Kline, 1993) and the Family Routines Inventory (Jensen et al., 1983). For this measure of chaos, the mother answered "true" or "false" to statements describing environmental stimulation ("You can't hear yourself think in our home"), confusion ("We can usually find things when we need them"), and rituals and routines ("[Target child] does his[her] homework at the same time each day"). Chaos, unlike all other measures we report here, was assessed only at Wave 2.

### Learned Helplessness

In Wave 2, learned helplessness was evaluated with a standard behavioral protocol (Glass & Singer, 1972) adapted for children (Bullinger, Hygge, Evans, Meis, & van Mackensen, 1999; Cohen, Evans, Stokols, & Krantz, 1986). The child was shown a picture of a tangram and instructed to reproduce the illustration with multiple plastic pieces that fit into a rectangular frame. The child could work on the puzzle until it was solved or until he or she felt unable to solve it. At that point, the child could move on to another tangram puzzle. Once the child moved on to the second puzzle, he or she could not return to the first puzzle. The child received the first test puzzle after the experimenter ensured that he or she

comprehended the task. Unbeknownst to the child, this first problem was unsolvable. The second puzzle was solvable. A total of 15 min was available for the two test puzzles. The number of seconds the child persisted on the first puzzle was the index of learned helplessness. This learned-helplessness measure is related to beliefs about personal control, experimental manipulations of control, and chronic exposure to uncontrollable stressors (Cohen, 1980; Cohen et al., 1986; Evans & Stecker, 2004; Glass & Singer, 1972). Learned helplessness was assessed in Wave 1 by giving children 10 min to draw linkages between familiar pictures without doubling back or lifting their pencil. Time spent working on the first problem, which could not be solved, was the measure of learned helplessness. Children were also given a second, solvable problem to work on (Evans, 2003).

### Psychological Distress

Psychological distress was measured in Wave 1 using the Rutter Child Behavior Questionnaire (Rutter, Tizard, & Whitmore, 1970) and in Wave 2 using the Youth Self Report instrument. The Youth Self Report has excellent reliability and has undergone extensive validation across a wide range of samples, 11 through 18 years of age (Achenbach, 1991). On a scale from 0 (*not true*) to 2 (*very true* or *often true*), participants answer whether symptoms describe them. These symptoms include "I feel lonely," "I worry a lot," and "I get in many fights." We combined internalization and externalization symptoms into one scale because the overall scale was reliable ( $\alpha = .93$ ), the two subscales were intercorrelated ( $r = .70$ ), and the Rutter Child Behavior Questionnaire combines both types of symptoms.

### Self-Regulatory Behavior

For Wave 1, a behavioral measure of delayed gratification was used to assess self-regulatory behavior (Evans, 2003). Self-regulation was assessed in Wave 2 with the Children's Self-Control Scale (Humphrey, 1982). The children's English teachers rated their behaviors on a 5-point rating scale (from *never* through *almost always true*). Examples of items on this scale are "This child thinks ahead of time about the consequences of his or her actions" and "This child sticks to what he or she is doing, even on long, unpleasant tasks, until finished." The scale has excellent reliability ( $\alpha = .91$  in the present study) and has been validated against multiple criteria (Humphrey, 1982).

## RESULTS

### Cross-Sectional and Longitudinal Analyses

Longitudinal analyses regressed socioemotional outcomes onto income-to-needs ratios at Wave 2 (Grades 7–8), controlling for the respective Wave 1 (Grades 3–5) outcome. In addition to these longitudinal results, we report cross-sectional data from Wave 1. For descriptive purposes, Table 1 reports means and standard errors for the Wave 2 sample split into poverty and middle-in-

**TABLE 1**

*Chaos, Learned Helplessness, Psychological Distress, and Self-Regulatory Behavior in Relation to Poverty at Wave 2*

Measure	Group			
	Poverty		Middle-income	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Chaos (22–44)	29.56	0.63	27.46	0.27
Helplessness (persistence in seconds)	443.34	24.28	547.23	22.84
Psychological distress (0–114)	15.28	0.86	12.37	0.56
Teacher ratings of self-regulatory behavior (8–40)	28.51	0.67	29.85	0.64

**Note.** In this table, the sample is divided into a poverty group (income-to-needs ratio  $\leq 1.0$ ) and a middle-income group (income-to-needs ratio  $> 1.0$ ) for descriptive purposes only. All inferential analyses maintained the continuous nature of the income-to-needs variable.

come groups. However, all inferential analyses maintained the continuous nature of the income-to-needs variable.

Income predicted learned helplessness among the middle school youth when learned helplessness at Wave 1 was statistically controlled,  $b = 31.03$ ,  $t(219) = 2.33$ ,  $p < .02$ ,  $f^2 = .02$ . These longitudinal findings replicate the cross-sectional association between income-to-needs ratio and learned helplessness at Wave 1,  $b = 22.91$ ,  $t(276) = 2.35$ ,  $p < .02$ ,  $f^2 = .03$ .

The youths' self-report of psychological distress was significantly affected by income, statistically controlling for Wave 1 distress,  $b = -0.86$ ,  $t(220) = 2.50$ ,  $p < .01$ ,  $f^2 = .03$ . At Wave 1, income-to-needs ratio was also significantly related to psychological distress,  $b = -1.99$ ,  $t(337) = 6.55$ ,  $p < .01$ ,  $f^2 = .14$ .

Teachers' ratings of self-regulatory behavior were also significantly related to income when Wave 1 self-regulatory behavior was controlled statistically,  $b = 1.14$ ,  $t(120) = 2.70$ ,  $p < .01$ ,  $f^2 = .05$ .<sup>1</sup> There was also a significant relation between income and self-regulatory behavior at Wave 1,  $b = 112.35$ ,  $t(199) = 3.41$ ,  $p < .01$ ,  $f^2 = .07$ .

### Chaos as a Mediator of the Relation Between Poverty and Socioemotional Development

In order to examine whether each of the longitudinal effects of income-to-needs ratio on socioemotional development was mediated by chaos, we conducted a series of hierarchical regression equations. As shown in Table 2, the first equation regressed learned helplessness onto income-to-needs ratio at Wave 2. (Note that in all the analyses reported in Tables 2 through 4, the respective Wave 1 outcome measure was included as a statistical control.) The second line of Table 2 shows the results of regressing learned helplessness onto chaos, the hypothetical mediator, and

<sup>1</sup>The sample size is much smaller for self-regulatory behaviors at Wave 2 than for the other outcome measures because we were dependent on the cooperation of teachers to provide this information.

**TABLE 2**

*Longitudinal Mediation Analysis of Learned Helplessness and Income-to-Needs Ratio at Wave 2, Statistically Controlling for Wave 1 Learned Helplessness*

Predictor	Total $R^2$	$\Delta R^2$	$F\Delta R^2$	<i>b</i> ( <i>SE</i> )
Income-to-needs ratio	.04*	.02*	5.42*	31.03* (13.32)
Chaos	.04**	.03**	6.92**	-12.27** (4.66)
Income-to-needs ratio controlling for chaos	.05**	.01	2.72	22.88 (13.86)

\* $p < .05$ . \*\* $p < .01$ .

the third line shows the results of regressing learned helplessness onto income-to-needs ratio after controlling for chaos. Of particular interest to the mediational hypothesis is the change in  $\Delta R^2$  from row 1 ( $\Delta R^2 = .02$ ) to row 3 ( $\Delta R^2 = .01$ ). The significant  $\Delta R^2$  for income-to-needs ratio in row 1 becomes statistically nonsignificant in row 3, after chaos is partialled out. Note also the 26% shrinkage in the beta weight ( $p < .05$ ) for income-to-needs ratio after chaos was partialled out (row 1:  $b = 31.03$ , row 3:  $b = 22.88$ ). Thus, the significant effect of income on learned helplessness was attenuated once chaos was controlled for. Income levels were significantly related to chaos,  $b = -0.85$ ,  $t(223) = 4.65$ ,  $p < .0001$ .

Table 3 depicts the parallel set of hierarchical regression equations for psychological distress. As in the analysis for learned helplessness, the statistically significant, longitudinal effect of income-to-needs ratio on psychological distress became nonsignificant, and the beta weight shrank significantly ( $p < .05$ ), after chaos was partialled out. The longitudinal relation between income and psychological distress was mediated by chaos.

The results for teachers' ratings of self-regulatory behavior (Table 4) are similar. The statistically significant longitudinal effect of income on self-regulatory behaviors was significantly attenuated ( $p < .01$ ) when chaos was partialled out.

## DISCUSSION

A healthy childhood environment requires regularity, consistency, predictability, and controllability. In order for proximal

**TABLE 3**

*Longitudinal Mediation Analysis of Psychological Distress and Income-to-Needs Ratio at Wave 2, Statistically Controlling for Wave 1 Psychological Distress*

Predictor	Total $R^2$	$\Delta R^2$	$F\Delta R^2$	<i>b</i> ( <i>SE</i> )
Income-to-needs ratio	.14**	.03*	6.27**	-0.86** (0.35)
Chaos	.16**	.05**	13.46**	0.44** (0.12)
Income-to-needs ratio controlling for chaos	.18**	.01	3.24	-0.63 (0.35)

\* $p < .05$ . \*\* $p < .01$ .

**TABLE 4**  
*Longitudinal Mediation Analysis of Self-Regulatory Behavior and Income-to-Needs Ratio at Wave 2, Statistically Controlling for Wave 1 Self-Regulatory Behavior*

Predictor	Total $R^2$	$\Delta R^2$	$F\Delta R^2$	$b$ (SE)
Income-to-needs ratio	.11**	.05**	7.30**	1.14** (0.42)
Chaos	.11**	.04*	5.84*	-1.06* (0.44)
Income-to-needs ratio controlling for chaos	.11**	.00	<1.0	0.11 (0.44)

\* $p < .05$ . \*\* $p < .01$ .

processes to be effective, they need to occur in a predictable manner, with some intensity over time, and with minimal interruption (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998). The immediate surroundings of low-income adolescents are more chaotic, consisting of noisier, more crowded, more frenetic, and less structured and predictable routines of daily living, than are the households of wealthier adolescents (see Table 1). Moreover, these chaotic conditions convey some of the adverse, longitudinal effects of poverty on children's socioemotional development (Tables 2–4). The longitudinal research design of this study, coupled with the cross-sectional replications plus multiple measures of socioemotional adjustment, lend confidence to these conclusions.

### Study Limitations

More low-income children than middle-income children left the sample between the first and second waves. Although none of the socioemotional outcomes showed selective attrition, concerns remain. For example, perhaps selective attrition biased our results because families who moved or could not be contacted again dealt with more chaos than those who remained in the sample. A related drawback is the absence of a chaos measure in Wave 1. Because we learned of the chaos index following Wave 1, we could not examine whether greater chaos was associated with an increased likelihood of dropping out of the sample. The absence of a Wave 1 chaos measure also precluded our examining whether changes in chaos over time explain changes in the outcome measures, which would have provided a more rigorous mediational test. Furthermore, although it is valuable to study rural poverty given researchers' nearly exclusive focus on inner-city deprivation, there may be critical aspects of inner-city chaos not captured in this study.

### Poverty, Self-Regulatory Behavior, and Learned Helplessness

In addition to showing that poverty is directly related to chaos, which, in turn, conveys some of poverty's impact on socioemotional development, the present study broadens the literature on chaos. Prior studies have relied primarily on self-reported outcomes, whereas we included a behavioral measure and teachers'

ratings. Also, this is the only longitudinal study of household chaos and children's well-being (Fiese et al., 2002; Repetti et al., 2002; Wachs & Corapci, in press). Furthermore, we have broadened the measurement of chaos by employing a multidimensional index that incorporates assessment of noise, crowding, confusion, and lack of structure and routines in the households of children and youth.

The learned-helplessness and poverty data are also noteworthy, given prior work showing negative associations between parental SES and children's control beliefs (Bandura et al., 2001; Battle & Rotter, 1963), as well as parenting practices that encourage self-directedness (Kohn, 1977; Luster et al., 1989). We build on this literature in two respects. First, our findings are longitudinal, and second, we demonstrate a link between poverty and an overt, behavioral index of learned helplessness rather than strictly subjective ratings. The present findings are also noteworthy in light of previous research showing that exposure to uncontrollable environmental stressors such as noise or crowding induces learned helplessness in humans (Cohen, 1980; Evans & Stecker, 2004).

There is widespread evidence of chaos and disarray in the lives of contemporary American children and youth, particularly among economically disadvantaged families. Levels of chaos are accelerating and pushing beyond the confines of poverty into middle- and upper-income families. Scholars and policymakers alike need to attend to these trends and contemplate their implications for future generations.

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