

Effects of Multiple Context and Cumulative Stress on Urban Children's Adjustment in Elementary School

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Using longitudinal data collected over 2 years on a sample of 2,745 urban elementary school children (1st–6th graders, ages 6–11 years) from economically disadvantaged communities, effects of stressful experiences within 3 contexts (school, family, neighborhood), cumulative stress, and multiple context stress on 3 indices of children's adjustment (achievement, depression, and aggression) were examined. All 3 stressor contexts were related contemporaneously and longitudinally to negative outcomes across adjustment measures, with differential paths in each predictive model. Cumulative stress was linearly related to increases in adjustment problems but multiple context stress was not related to problematic adjustment beyond effects of cumulative stress alone. The important influence of life events stress on children's adjustment in disadvantaged communities is discussed.

In the present study, we build on and expand previous research examining the stress–adjustment relation among elementary school children growing up in disadvantaged urban communities (Brooks-Gunn, Duncan, & Aber, 1997; Evans & English, 2002; Guerra & Williams, 2005; Roosa et al., 2005; Taylor, Seaton, & Rodriguez, 2002; Yates, Egeland, & Sroufe, 2003). We focus on the role of stress in children's school achievement, depression, and aggression. These three outcomes represent important components of adjustment (or maladjustment) during the elementary school years. Using longitudinal data from a large developmental study of urban elementary school children, we consider different mechanisms by which stress in three specific contexts (school, family, and neighborhood) can influence these outcomes. We are particularly interested in whether the impact of contextual stress varies as a function of the particular type of stress experienced in a given context, the cumulative amount of stress experienced, or the experience of stress across more than one or multiple contexts.

Do Different Types of Stress Differentially Impact Children's Adjustment?

A central question for the study of the stress–adjustment relation in children is whether specific

types of stressors impact specific outcomes. Indeed, there is a large literature examining the impact of one or more types of stress on adjustment outcomes. These studies often identify a particular stressor or set of stressors within a given context and examine related behavioral, mental health, and academic adjustment outcomes.

For example, problems in school with teachers or peers can create stressful circumstances for children. Trouble with teachers and schoolmates may prompt frustration and adjustment difficulties. Children who are poorly invested in school are also commonly found to struggle behaviorally and academically (Blum, McNeely, & Rinehart, 2002; Ozer, 2005). In addition, peer victimization and rejection experienced in children's school environments have been found to be consistently associated with concurrent and later academic, emotional, and behavioral problems (Rubin, Bukowski, & Parker, 1998). One of the most robust findings in the peer status literature is that rejection by one's peers is associated with externalizing problems (Coie, Dodge, & Coppotelli, 1982; Laird, Jordan, Dodge, Pettit, & Bates, 2001; Little & Garber, 1995), growth in aggression (Dodge et al., 2003), and a host of other difficulties (Parker & Asher, 1987). Peer victimization has been found to be associated with posttraumatic stress disorder (PTSD) symptoms (Mynard, Joseph, & Alexander, 2000), later internalizing problems (Hodges & Perry, 1999), and to predict concurrent and later aggression and delinquency (Hanish & Guerra, 2002).

This study was supported by a National Institute of Child Health and Development Grant 38581 to the second author.

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However, studies of peer rejection and victimization typically do not cast them as life events stressors. In general, peer rejection and victimization have been alternately cast as either "personality traits" that characterize specific types of children (e.g., Bierman, Smoot, & Aumiller, 1993) or characteristics of the peer group that do not tap children's traits (e.g., Olweus, 1989, as cited in Dodge et al., 2003). An alternate perspective has recently been suggested by Dodge et al. (2003). They note that "social rejection merits study as a chronically stressful experience, in the same way that physical abuse, rape, early loss of a parent, and the experience of victimization by bullying peers merit empirical inquiry." (p. 375). From this perspective, peer rejection and peer victimization are seen as life events stressors that can exert a negative influence on developmental outcomes. Furthermore, many studies of peer rejection and victimization do not address whether adverse effects are exacerbated for children growing up in poor communities who simultaneously must cope with multiple environmental stressors.

Living in communities with high rates of poverty also creates additional stress on families that, in turn, can compromise children's development. There is a robust literature linking economic disadvantage to greater risk for developmental adversity and multiple adjustment difficulties (Ackerman, Brown, & Izard, 2004; Dodge, Pettit, & Bates, 1994; Dubow, Edwards, & Ippolito, 1997; Guerra, Huesmann, Tolan, Van Acker, & Eron, 1995; McLoyd, 1998; Mistry, Vandewater, Huston, & McLoyd, 2002). Further, families with few available resources are often forced to look for new opportunities to thrive or just survive, creating a series of transitions for themselves and their children. There is substantial evidence indicating that family characteristics and transitions can be risk factors for children's concurrent and future antisocial behavior (Loeber & Dishion, 1983; McCabe, Clark, & Barnett, 1999; Tolan, 1988; Tolan & Loeber, 1993). In addition, increases in family level stressors have been found to predict increases in externalizing and internalizing problems (Forehand, Biggar, & Kotchik, 1998; Shaw & Emery, 1988) as well as academic problems (Gonzales, Cauce, Friedman, & Mason, 1996). Greater levels of family disruption and transitions can create environments lacking in stability and structure that are a likely source of stress for both parents and children and can adversely impact children's development.

In addition to family stressors linked to resource scarcity that are more pronounced in poor areas, disadvantaged urban communities are often characterized by high rates of violence. Indeed, a number of

studies have examined the effects of violence exposure on children's adjustment. These studies have found links between neighborhood violence exposure and a host of childhood problems, including symptoms of PTSD (Fitzpatrick & Boldizar, 1993; Martinez & Richters, 1993; Singer, Anglin, Song, & Lunghofer, 1995), emotional distress (Self-Brown, LeBlanc, & Kelley, 2004), poor academic functioning (Bowen & Bowen, 1999; Shumow, Vandell, & Posner, 1999), internalizing and depression (Moses, 1999; Singer et al., 1995; Youngstrom, Weist, & Albus, 2003), and externalizing and aggression (Attar, Guerra, & Tolan, 1994; Gorman-Smith & Tolan, 1998; Guerra, Huesmann, & Spindler, 2003; Youngstrom et al., 2003).

In sum, specific types of stressors in specific contexts have been found to predict a number of related adjustment difficulties in children. Specifically, school stressors of peer rejection, peer victimization, and school problems, family stressors relating to poverty and life transitions, and neighborhood stressors of violence exposure have all been shown to predict concurrent and future difficulties. Rather than specific stressors predicting only specific adjustment problems, each type of stressor has been found to be related to a variety of problems including academic difficulties, depression, and aggression. These relations typically are exacerbated under conditions of neighborhood adversity (Taylor et al., 2002). However, few studies have examined simultaneously the impact over time of different types of stressors across multiple contexts and on multiple indicators of adjustment for girls and boys growing up in disadvantaged urban communities.

Does the Cumulative Amount of Stress Experienced Impact Children's Adjustment?

Studies focusing on relations between specific types of stressors and children's adjustment problems can illustrate the specific contribution of a particular stressor to one or more adverse outcomes as well as the types of stressors contributing to a single adverse outcome. This methodology allows for examination of the relative contributions of different types of stress risk while at the same time comparing the relative salience of each type of stress. However, this approach does not adequately consider the fact that stressors rarely occur in isolation but typically co-vary both within and across contexts (Sameroff, Seifer, & Bartko, 1997).

Beyond experiencing individual types of stressors, children may be subjected to additional vulnerability when exposed to the cumulative effects of experiencing multiple stressors that may be partic-

ularly problematic for their development. From this perspective, it is the accumulation of stressors rather than a single type of stress experience that must be understood vis-à-vis development. This is particularly true for children growing up in poor communities, where exposure to multiple stressors is more likely. According to the cumulative risk hypothesis, it is not the presence or absence of specific risk factors that impacts development, but the accumulation of risk factors, with more cumulative risk leading to greater adjustment difficulties (Appleyard, Egeland, vanDulmen, & Sroufe, 2005; Sameroff, 2000).

Research conducted in a number of different countries provides support for a focus on cumulative risk. Perhaps the most well known study of cumulative risk was conducted by Rutter and colleagues in London and the Isle of Wight (Rutter, Cox, Tupling, Berger, & Yule, 1975). Specifically, they found that although no single risk factor was a significant predictor of maladjustment, two or more indicators of family adversity were associated with up to a fourfold increase in children's behavior problems, and four risk factors resulted in a 10-fold increase. More recent studies have also supported the finding that adjustment difficulties are often the product of cumulative stress across multiple contexts (Call & Mortimer, 2001; Sameroff et al., 1997; Thornberry, Smith, & Howard, 1997).

An unresolved issue in the cumulative risk literature is the extent to which the relation between cumulative risk and adjustment follows a linear model, with increasing number of risk factors linked with a parallel increase in adjustment problems, versus the extent to which it follows a quadratic model based on risk threshold. The work of Rutter and others suggests a threshold or quadratic effect, with dramatic jumps in problematic outcomes linked with specific stress thresholds (Forehand et al., 1998; Rutter et al., 1975). In contrast, other studies have found evidence for a more linear effect (Appleyard et al., 2005; Evans & English, 2002; Sameroff et al., 1997). In the current study, we examine both linear and quadratic models of cumulative risk exposure on adjustment. Because we consider the effects of stress within the context of urban disadvantage, we predict that this relatively high "threshold" that all children experience at the community level will render each additional stressor more problematic, supporting a linear model under conditions of high disadvantage.

Does the Impact of Cumulative Stress Vary by the Number of Contexts Where it Occurs?

One disadvantage of considering cumulative stress is that summary scores do not provide details

about contexts in which stress occurs. Even a quadratic model that examines threshold effects does not account for stress within a single context versus stress across multiple contexts. In other words, knowing that two stressors portends a fourfold increase in risk does not tell us whether these two stressors are both impacting school functioning or whether one stressor is related to school functioning and the other is related to lack of family resources. Yet, it may be that stressors across multiple contexts are more disruptive for development than the same number of stressors within a single context. For example, experiencing four stressors in the family context but no stressors in the school/peer contexts may be qualitatively different than experiencing two stressors in each context. As this illustrates, a cumulative stress measure does not capture the extent to which stress is spread out across contexts or confined to a particular context. It may well be that having no "safe haven," that is, nowhere to go for respite, portends more negative consequences than having high stress in one context but low stress in others, particularly in contexts such as the family that can serve more broadly as a buffer for stressors outside of the family (Gorman-Smith, Henry, & Tolan, 2004).

Studies looking at cumulative stress typically look at summary scores of stress across multiple contexts, but do not examine separately the effects of experiencing these stressors in a single context or in multiple developmental contexts. One recent exception is a study by Gerard and Buehler (2004) that examined whether adolescents with more protective individual attributes were less affected by cross-context stress risk. Using data on 5,070 adolescents participating in the National Longitudinal Study of Adolescent Health (Add Health), interactions were reported for concurrent aggression and depression and depression 1 year later, such that adolescents with more protective attributes were less likely than youth with fewer attributes to experience adverse outcomes in the face of cross-context stress risk. However, adjustment problems also increased across all levels of protective factors as number of stress risk contexts increased. To address this concern, in the present study, we also examined whether the experience of stress across multiple developmental contexts influenced children's adjustment beyond the effects of cumulative stress irrespective of the context in which it was experienced.

Does Gender Moderate the Stress-Adjustment Relation?

It is also important to examine differences in the stress-adjustment relation for boys and girls across

different types of stress and different stress contexts. For instance, studies have shown that violence exposure is more likely to predict subsequent aggression for boys than for girls (Attar et al., 1994). School context stress effects may also vary for boys and girls, as studies have shown qualitative differences in the social relationships of boys and girls and the effects of these relationships on development (Maccoby, 1986, 1990). Familial stress also may be particularly problematic for girls because of their relatively greater focus on relationship issues, although greater familial protectiveness toward girls may serve to buffer the effects of other stressors (Beyers, Bates, Pettit, & Dodge, 2003). There is some recent research to suggest that boys and girls experience potential family stress factors differently (Beyers et al., 2003; Gaylord, Kitzmann, & Lockwood, 2003). However, these findings have not been consistent across studies; a number of recent studies of family stressors have failed to find sex differences in adjustment outcomes (Conger et al., 2002; Forehand et al., 1998).

Hypotheses

Two main questions related to the impact of stress on academic achievement, depression, and aggression drive the present research. First, what are the individual contributions of different types of stressors to these outcomes and do they vary by gender? We hypothesize that each stress type will predict adjustment problems and that these relations will be moderated by gender. Because urban elementary school-aged children are learning to negotiate the demands of the school setting in low resource and often unsupportive contexts, we expect that stress across all contexts will have the greatest negative effects on school achievement. On the basis of girls' greater emphasis on social connections, we expect that family and school stressor effects will be related more strongly to negative outcomes for girls than boys.

Second, what effect does experiencing cumulative stress have on children's adjustment, and are these effects greater when stress occurs across multiple contexts? We hypothesize that cumulative stress will be related to higher levels of adjustment problems across all outcomes, although we do not have specific predictions for linear versus threshold effects. Furthermore, we expect that experiencing stress in multiple contexts will contribute uniquely to these adjustment difficulties beyond the effect of cumulative stress alone. Finally, we expect that both cumulative and multiple context stress will result in negative effects on achievement for both boys and

girls, but increases in depression for girls only and increases in aggression for boys only.

Method

Participants

Participants were part of the Metropolitan Area Child Study, a developmental and prevention study of 4,458 first- through sixth-grade children in 21 urban Midwestern schools (Guerra et al., 2003). Schools were selected after volunteering from neighborhoods with high levels of economic disadvantage. Parental permission was solicited for all first-through sixth- grade students in the 1st year of the study in each of the selected schools, and then for each subsequent year for every child entering the first grade in those schools. Participants in the present study were a subset of the larger sample for whom completed assessments on the primary measures were available over a 2-year period. This subset was comprised of children who were initially assessed when they were in Grades 1–4 (Time 1) and subsequently assessed when they were in Grades 3–6 (Time 2). Time 1 measures were collected on a total of 2,745 children. Time 2 assessments were collected on those children who remained in the study 2 years after the initial assessments. The sample was approximately evenly divided by sex and primarily comprised of ethnic minority children (42% African American, 45% Latino, and 13% non-Hispanic White). The participants came from lower socioeconomic status families, with many qualifying for free lunch programs in their schools.

Attrition rates between Time 1 and Time 2 were approximately 30%, which is not unusual for urban elementary schools in economically disadvantaged communities (see Guerra et al., 2003, for a detailed description of attrition issues). Participant attrition due to the high mobility of the population and school and classroom limitations on time for administrations resulted in a complex pattern of data available for analyses. In general, comparisons of participants retained at Time 2 with those who dropped out after the initial assessments show that those who dropped out have higher aggression scores at Time 1. This results in a more conservative estimate of aggression levels in the retained population at Time 2, but limits the generalizability of the reported results to some degree.

Measures and Assessment Procedures

Time 1 measures were collected from children in Grades 1–4, representing a relatively young

elementary-school-aged group. These assessments included self-reports of stressful life events, peer ratings of children's victimization, rejection, and aggression, and teacher ratings of children's depression and aggression. The Time 2 measures were collected 2 years after the initial assessments and were identical to those administered at Time 1. The self-report and peer nomination assessments were administered to children individually for first-grade children and by group classroom administrations for all other children. Administrators received extensive assessment training for conducting individual and group sessions in urban elementary school environments. In each case (i.e., both individual and group sessions), questions were read aloud to children. Teams of administrators for group sessions consisted of one investigator and two monitors for each classroom session. For Spanish-speaking children, measures were translated using back-translation methods and were read to them by native Spanish speakers. No problems in comprehension on the self-report or peer-rating measures were noted. For all measures, we computed reliability within the whole sample, and also within each ethnic group, age group, and for boys and girls. We report overall sample reliabilities for each measure below.

Stress Exposure

Children's exposure to stress was measured in three different contexts, school stress, family stress, and neighborhood stress, using self-report measures, peer nominations, and archival data. The primary self-report measure of stress in each context was the Stressful Urban Life Events Scale (Attar et al., 1994). This measure was designed to assess children's experience of stressful events over a 1-year period. Children respond yes (1) or no (0) to each item according to whether they had experienced that stressor in the last year. Each subscale score is the mean for all the items for that scale, with higher scores indicating greater experience of stress in specific contexts. Although we report internal consistencies for each subscale, it is important to note that although these are relatively modest, each item on each scale is essentially an indicator of children's experience or lack of experience with an individual stress item and would not necessarily be expected to correlate highly with their experience of any other stress item even when they are in the same contextual domain (Ozer, 1999). Relevant contextual subscales from this measure were utilized in addition to other peer sociometric ratings and archival data as noted below for specific stress contexts.

School stress. Three types of stress in the school context were measured: peer rejection, peer victimization, and school problems stress. Two subscales from the Peer-Nominated Index (Eron, Walder, & Lefkowitz, 1971) were used to assess children's levels of peer rejection (two items) and victimization (two items) at school. Peer nomination measures have a long history of demonstrated reliability and validity with various ethnic and socioeconomic populations (Eron, Huesmann, Lefkowitz, & Walder, 1972; Huesmann & Eron, 1986). In this assessment procedure children are provided with a class roster of all the students in their class, grouped separately by sex. Children are asked to circle the name of each child who fits the question given at the top of each page. The experimenter reads each question aloud, pacing the children so that the same amount of time is given for each question. Each child's rejection and victimization scores are obtained by summing the number of nominations they receive for each scale divided by the total possible nominations they could have received. The scores for each of these subscales range from 0 to 1. Internal reliabilities for the rejection and victimization subscales were $\alpha = .93$.85, respectively.

The School Problems Stress subscale (three items) from the Stressful Urban Life Events Scale (Attar et al., 1994) was used to measure school stress and included items tapping children's stress from problems experienced at school (e.g., getting into trouble with the teacher; worrying about grades). Internal reliability for this subscale was $\alpha = .63$. In measurement models preceding the estimation of our final structural models, the School Problems Stress subscale path coefficient was $\beta = .15$ (with a measurement error estimate of .07), indicating that although the scale contributed the smallest amount of variance to overall school stress measurement, its reliability was within acceptable levels.

Family stress. Family stress was operationalized as family poverty and family transitions. Family poverty was assessed with school archival data on children's free lunch status. Children were assigned to one of three categories based on official school records for each year of participation in the study: no free lunch (scored 0), partial free lunch (scored 1), or full free lunch (scored 2). These scores were then summed and divided by the number of years the child was in the study to obtain their average free lunch status score (FL). The FL score is an adequate proxy variable for family economic disadvantage as the maximum family income allowed to obtain free lunch is slightly above the poverty line; thus qualifying for full free lunch or partial free lunch over a

number of years is an indicator of greater levels of economic disadvantage.

The Family Transitions subscale (four items) of the Stressful Urban Life Events Scale (Attar et al., 1994) was used to assess children's family-related life transition stress. Subscale response scoring was derived as above. This measure assesses stress resulting from transitions occurring at the family level (e.g., family move; having a new baby come into the family). Items for this subscale were drawn from the Social Stress Measure developed by Tolan (1988). In that earlier study it was found that higher scores on this scale were related to higher levels of antisocial behavior and delinquency. The internal consistency of this scale was $\alpha = .50$. Although internal consistency for this scale was low, in measurement models preceding estimation of our final structural models, the Family Transitions subscale path coefficient was $\beta = .55$ (with a measurement error estimate of .05), indicating that the scale had an acceptable level of reliability.

Neighborhood stress. Neighborhood violence was used as the indicator of neighborhood stress exposure, using a subscale of the Stressful Urban Life Events Scale (Attar et al., 1994). The Neighborhood Violence Stress subscale (six items) includes violent events likely to be experienced or witnessed by urban elementary school children (e.g., knowing someone who had been beaten or attacked; being afraid to go outside because of gangs or drugs). The internal consistency of this subscale was $\alpha = .54$. In our previous studies using this scale, children's scores were also found to be significantly related to official crime data on violence rates in the participant's communities (Attar et al., 1994), lending support to the validity of the scale for measuring neighborhood violence-related stress. An additional measure of reliability came from our measurement models preceding the estimation of our final structural models in which the path coefficient for the Neighborhood Violence Stress subscale was $\beta = .61$ (with a measurement error estimate of .05), indicating that the scale had an acceptable level of reliability.

Adjustment Measures

School achievement. Math and reading achievement were measured with archival scores from children's school data. These scores were children's averaged percentile scores on the Iowa Test of Basic Skills, with higher scores indicating greater achievement.

Depression. Children's depression was measured with a subscale of the Child Behavior Checklist (TRF;

Achenbach, 1991). As above, teachers are asked to rate children on a set of behavioral items representing depressive symptoms (six items). The response range for this scale is 0 (*not true*)–2 (*very true*), and the sum of all items represents each child's depression score. The internal reliability for this scale was $\alpha = .74$.

Aggression composite. Children's aggressive behavior was assessed using two sources of information, peer nominations of aggression and teacher reports of aggression. The Peer-Nominated Index of Aggression (Eron et al., 1971) was used to assess children's aggressive behavior. As above, in this assessment procedure, children are nominated by their classmates and their aggression scores are derived from a ratio of total nominations received out of all possible nominations. The internal reliability for this scale was $\alpha = .97$. Teachers also completed the teacher rating of aggression scale on the Child Behavior Checklist (TRF; Achenbach, 1991). On this measure teachers are asked to rate children according to the degree to which each child exhibits the behavior for each item. The response range is 0–2, and the items are summed to derive each child's aggression score. This measure has been found to have good validity and reliability in previous studies, and had an internal reliability of $\alpha = .78$ in our study. The peer nomination scores and the teacher ratings were combined to create an aggression composite variable. In previous research we have used this composite score to capture variation in aggression scores from multiple sources (MACS, 2002).

Results

Results are presented in three major sections. First, we present the findings examining the contributions of different types of stress to children's achievement, depression, and aggression. Second, we examine the effects of experiencing cumulative and multiple context stress on the same outcomes. Third, we examine the linear versus quadratic effects of cumulative stress on adjustment outcomes. In each section, we report both contemporaneous and longitudinal effects.

Effect of Stress Type on Adjustment

In Table 1, the zero-order correlations among Time 1 stress types, Time 1 adjustment measures, and Time 2 adjustment measures are presented. As can be seen, stress types correlated with adjustment measures in the expected direction. To investigate

Table 1
Correlations Among Time 1 Stressors (Grades 1–4), Time 1 Adjustment (Grades 1–4), and Time 2 Adjustment (Grades 3–6)

Time 1 stressors	Time 1 Peer reject	Time 1 Peer victimization	Time 1 School problems	Time 1 Family transitions	Time 1 Economic disadvantage	Time 1 Neighborhood violence	Time 1 Math achievement	Time 1 Reading achievement	Time 1 Depression	Time 1 Aggression	Time 2 Math achievement	Time 2 Reading achievement	Time 2 Depression
Peer victimization	.62***												
School problems	.14***	.11***											
Family transitions	.06***	.07***	.40***										
Economic disadvantage	.02	.03 [†]	.11***	.22***									
Neighborhood violence	.10***	.12***	.26***	.33***	.15***								
<i>Time 1 adjustment</i>													
Math achievement	-.14**	-.08***	-.12***	-.12***	-.16***	-.11***							
Reading achievement	-.14***	-.06***	-.07***	-.09***	-.15***	-.10***	.65***						
Depression	.20***	.17***	.09***	.10***	.11***	.07***	-.03 [†]	-.03 [†]					
Aggression	.62***	.51***	.24***	.13***	.08***	.14***	-.16***	-.16***	.35***				
<i>Time 2 adjustment</i>													
Math achievement	-.13***	-.10***	-.03	-.02	-.12***	-.01	.29***	.21***	-.11***	-.09***			
Reading achievement	-.10***	-.09***	-.02	-.01	-.10***	-.01	.25***	.25***	-.10***	-.09***	.87***		
Depression	.16***	.14***	.08**	.12***	.10***	.04	-.10***	-.12***	.10***	.18***	-.13***	-.10***	
Aggression	.45***	.33***	.18***	.14***	.09***	.14***	-.17***	-.20***	.19***	.64***	-.20***	-.19***	.35***

[†]*p* < .10, ***p* < .01, ****p* < .001.

the contributions of different types of stress to the prediction of later adjustment, latent variable modeling using AMOS 6.0 was employed. A series of structural equation models (SEM) was used to examine the hypothesized relationship between type of stress and adjustment. In these analyses, one structural model was estimated for Time 2 achievement (math and reading), one model for Time 2 depression, and one model for Time 2 aggression.

Several of the stress measures used had either no reliability estimates (i.e., economic disadvantage) or less than optimal internal reliability; therefore, the degree of model measurement error was a concern. By utilizing SEM methods as opposed to regression methods, we were able to incorporate measurement error into our measurement models, thereby addressing possible random measurement error attenuation in the relations between the stressors and the adjustment outcomes.

Estimation for all models was by maximum likelihood estimation. Evaluation of fit was assessed using a χ^2 index, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The CFI indexes the degree of model fit with values ranging from zero to 1.00, and a good fit was considered to be > .90 (Hu & Bentler, 1999). The RMSEA indexes the model fit per degree of freedom. A close fit for the RMSEA is considered to be < = .05 (Browne & Cudeck, 1993), with less well fitting but adequate models considered to be between .08 and .10 (MacCallum, Browne, & Sugawara, 1996).

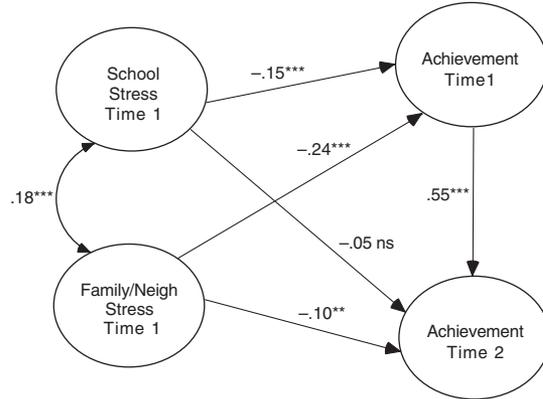
Initially, measurement models were specified to examine the reliability of each stress indicator's covariance structure before combining all stress indicators into the broader stress model. On the basis of these results and given the limitation of having a single subscale as an indicator for neighborhood stress, family and neighborhood stressors were combined into a single stress context. Two considerations informed this decision. First, we conceptualized school-type stressors as being clearly distinct from both family and neighborhood stressors because of their more proximal nature (victimization, rejection, and getting into trouble at school compared with the consequences of poverty and knowing someone who had been victimized). In addition, the neighborhood stress measurement model with the single subscale was not sufficiently identified whereas the family stress measurement model (with two subscale indicators) had adequate fit indices and, when combined with neighborhood stress, showed a modest improvement in fit indices. Fit indices for both final measurement models were excellent with CFI = .98 and RMSEA = .01 (90%

confidence interval [CI] = .00-.03) for school stress (peer victimization $\beta = .62$ and school problems $\beta = .16$, both $p < .001$), and CFI = .95 and RMSEA = .03 (90% CI = .02-.05) for family/neighborhood stress (family transitions $\beta = .55$ and neighborhood violence $\beta = .61$, both $p < .001$).

For each structural model, two types of Time 1 stress were specified: school stressors and family/neighborhood stressors. The school stressors were peer rejection, peer victimization, and school problems. The family/neighborhood stressors were family transitions, economic disadvantage, and neighborhood violence exposure. Only structural models and standardized regression weights are shown for each of the structural models. To maintain the consistency of the sample in these longitudinal analyses, we used only the sample of children for whom complete data on the stressors were available.

The structural model estimating achievement from Time 1 stress was found to be a close fit to the data with CFI = .91, RMSEA = .05 (90% CI = .05-.06), and $\chi^2(29, N = 9,664) = 814.11, p < .001$. As shown in Figure 1, both Time 1 school and family/neighborhood stress predicted decreases in Time 1 achievement, $\beta = -.15, p < .001$ and $\beta = -.24, p < .001$, respectively, with family/neighborhood stress having a moderately stronger effect. Family/neighborhood stress at Time 1 was also found to predict decreases in Time 2 achievement directly, $\beta = -.10, p < .05$. Although Time 1 school stress was not found to have direct effects on Time 2 achievement, indirect effects were found through Time 1 achievement, $\beta = -.08, p < .001$. In addition, family/neighborhood stress was found to have a moderate negative effect on Time 2 achievement through lower levels of Time 1 achievement, $\beta = -.13, p < .001$.

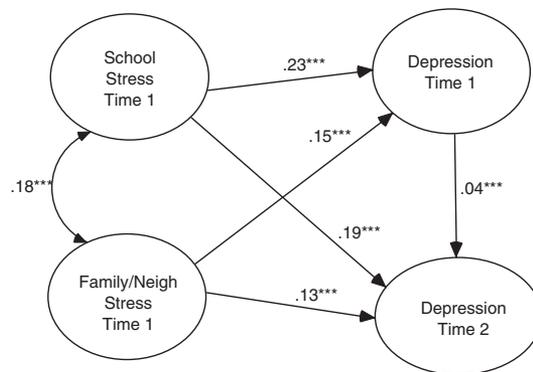
The structural model estimates predicting depression from Time 1 stress were found to have a reasonable fit, with CFI = .90, RMSEA = .07 (90% CI = .06-.07), and $\chi^2(16, N = 9,664) = 687.84, p < .001$ (see Figure 2). Both Time 1 school stress and family/neighborhood stress were found to predict higher levels of Time 1 depression, $\beta = .23, p < .001$, and $\beta = .15, p < .001$, respectively, with school stress having a moderately stronger effect. Interestingly, both types of Time 1 stress also had moderate direct effects on Time 2 depression, $\beta = .19, p < .001$ for school stress, and $\beta = .13, p < .001$ for family/neighborhood stress; however, no substantive indirect effects were found through Time 1 depression.



Note. Standardized coefficients shown (β), CFI = .92, RMSEA = .05, $\chi^2(29, N = 9664) = 814.11, p < .001$. Indirect effects: school stress on Time 2 achievement $\beta = -.08, p < .001$; family/neighborhood stress on Time 2 achievement $\beta = -.13, p < .001$. * $p < .10$, ** $p < .05$, *** $p < .001$

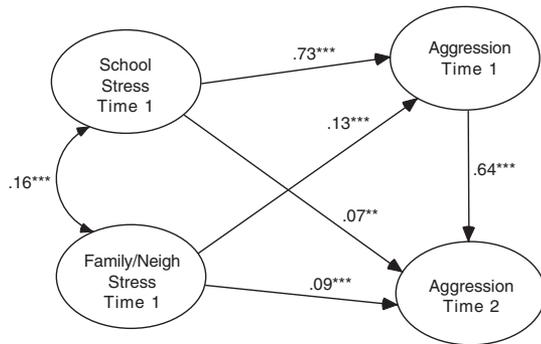
Figure 1. Structural model of two types of stress at Time 1 (Grades 1-4) predicting achievement at Time 1 and Time 2 (Grades 3-6).

The structural model estimates predicting aggression from Time 1 stress were found to have a reasonable fit, with CFI = .91, RMSEA = .07 (90% CI = .06-.07), and $\chi^2(16, N = 9,664) = 735.16, p < .001$ (see Figure 3). Both Time 1 school stress and family/neighborhood stress were found to predict higher levels of Time 1 aggression, $\beta = .73, p < .001$ and $\beta = .13, p < .001$, respectively, with school stress having a much stronger effect. In addition, both types of stress had small direct effects on higher levels of Time 2 aggression, $\beta = .07, p < .05$ for school stress, and $\beta = .09, p < .001$ for family/neighborhood stress. The indirect effects seemed to follow a similar pattern, with school stress having a stronger indirect effect on Time 2 aggression through Time 1 aggression, $\beta = .47, p < .05$, and family/neighborhood stress



Note. Standardized coefficients shown (β), CFI = .90, RMSEA = .07, $\chi^2(16, N = 9664) = 687.84, p < .001$. No indirect effects were found on Time 2 depression. * $p < .10$, ** $p < .05$, *** $p < .001$

Figure 2. Structural model of two types of stress at Time 1 (Grades 1-4) predicting depression at Time 1 and Time 2 (Grades 3-6).



Note. Standardized coefficients shown (β), CFI = .91, RMSEA = .07, χ^2 (16, $N = 9664$) = 735.16, $p < .001$. Indirect effects: school stress on Time 2 aggression $\beta = .47$, $p < .05$; family/neighborhood stress on Time 2 aggression $\beta = .08$, $p < .001$. * $p < .10$, ** $p < .05$, *** $p < .001$

Figure 3. Structural model of two types of stress at Time 1 (Grades–4) predicting aggression at Time 1 and Time 2 (Grades 3–6).

having a smaller indirect effect on higher levels of Time 2 aggression through Time 1 aggression, $\beta = .08$, $p < .001$.

To test for gender effects, after initial specification, each model was also respecified separately for girls and for boys. Our hypothesis that more negative outcomes would be evident for girls than for boys was not supported. Model fit indices and parameter estimates were essentially identical for both the female and male models, indicating that the original model was appropriate for both genders.

Contrary to expectations, school achievement was not found to be most negatively affected by stress across both school stressors and family/neighborhood stressor types. Comparisons of effect sizes between the achievement ($R^2 = .10$ for Time 1 and $R^2 = .40$ for Time 2), depression ($R^2 = .09$ for Time 1 and $R^2 = .07$ for Time 2), and aggression ($R^2 = .58$ for Time 1 and $R^2 = .52$ for Time 2) models, for both direct (concurrent) and indirect (2 years later) adjustment effects, revealed that aggression levels were most negatively affected.

Cumulative Stress, Multiple Context Stress, and Adjustment

Stress composite variables. A cumulative stress index (CSI) was constructed based on children's level of exposure to each type of stress. For each stressor (except average free lunch status), exposure was defined as having occurred if a child's score was 1 *SD* greater than the mean for the sample. For average free lunch status, children who qualified for full free lunch for all the years in the study (i.e., with scores of 2 on FL) were categorized as having experienced

economic disadvantage stress. Each stressor was then coded as either 0 (*not present*) or 1 (*present*) for each child. Children's scores on each stressor were then summed to obtain their total CSI score. The CSI scores ranged from 0 to 6. This index was constructed as a general index of children's exposure to cumulative stressors regardless of the type of stress experienced.

In addition, a multiple context stress variable (MCS) was constructed. This variable was a composite with two levels: exposure to stress in zero or only one stress context (i.e., school or family or neighborhood stress only; coded 1), and exposure to stress in two or more contexts (e.g., experiencing stress in both family and school contexts; coded 2). This composite variable was constructed as an index of experiencing stress in multiple developmental contexts as opposed to experiencing relatively little or no stress across developmental contexts.

Cumulative stress. To investigate the effects of cumulative stress on adjustment, one SEM was estimated for each type of adjustment (i.e., achievement, depression, and aggression). Examination of the measurement model estimates of the CSI revealed that they were essentially equivalent for the three adjustment models; the strongest stress factors were peer rejection and peer victimization, $\beta = .69$ and $\beta = .63$, respectively; with school problems $\beta = .17$, family transitions $\beta = .12$, and neighborhood violence $\beta = .15$ showing moderate stress effects; and economic disadvantage having the smallest stress effect $\beta = .08$ (all stress indicators were significant in the CSI measurement model at $p < .001$).

The structural model estimates predicting achievement from the Time 1 CSI were found to have a good fit, with CFI = .91, RMSEA = .05 (90% CI = .04–.05), and $\chi^2(32, N = 9,664) = 798.64$, $p < .001$. Cumulative stress was found to predict moderate decreases in Time 1 achievement, $\beta = -.16$, $p < .001$, and small decreases in Time 2 achievement directly, $\beta = -.07$, $p < .05$. The indirect effects of Time 1 cumulative stress on Time 2 achievement through Time 1 achievement were essentially equal in magnitude to the direct effect of CSI on Time 2 achievement (indirect effect was $\beta = -.09$, $p < .001$ compared with the direct effect $\beta = -.07$). Squared multiple correlations for the endogenous variables in the achievement model showed that only 5% of the variance in Time 1 achievement was predicted by the model; however, 40% of the variance in Time 2 achievement was accounted for by the variables in the model.

The structural model estimates predicting depression from the Time 1 CSI were found to have a reasonable fit, with CFI = .90, RMSEA = .06 (90%

CI = .05–.06), and $\chi^2(19, N = 9,664) = 651.68, p < .001$. Cumulative stress was found to predict higher levels in Time 1 depression directly, $\beta = .26, p < .001$. Interestingly, although Time 1 cumulative stress did not have a significant indirect effect on Time 2 depression through Time 1 depression ($\beta = .01$), the Time 1 CSI did have a direct effect on Time 2 depression, $\beta = .21, p < .001$, almost equal in magnitude to its direct effect on Time 1 depression (Time 1 was $\beta = .26$ compared with Time 2, $\beta = .21$). Squared multiple correlations for the endogenous variables in the depression model showed that only 10% and 7% of the variance in Time 1 and Time 2 depression, respectively, was accounted for by the variables in the model.

The structural model estimates predicting aggression from the Time 1 CSI were found to have a reasonable fit, with CFI = .92, RMSEA = .06 (90%CI = .05–.06), and $\chi^2(19, N = 9,664) = 652.43, p < .001$. Time 1 cumulative stress was found to predict higher levels of Time 1 and Time 2 aggression directly, with the direct effect at Time 1 being substantially stronger, $\beta = .67, p < .001$, than the direct effect on Time 2 aggression, $\beta = .12, p < .05$. In addition, Time 1 cumulative stress also predicted higher levels of Time 2 aggression through Time 1 aggression with a relatively strong effect, $\beta = .40, p < .001$. Squared multiple correlations for the endogenous variables in the aggression model showed that 45% and 46% of the variance in Time 1 and Time 2 aggression, respectively, was predicted by the variables in the model.

Cumulative versus multiple context stress. To investigate whether experiencing stress in multiple contexts was more problematic than simply experiencing cumulative stress, four sets of ANOVAs were calculated. In the first two sets of these analyses, the criterion variables were the two types of achievement (math and reading). In the next two sets of analyses, the criterion variables were depression and aggression. In each equation, four predictors were entered: (a) the CSI as an indicator of cumulative stress regardless of the type of stress experienced, (b) the MCS composite as an indicator of exposure to stress in multiple contexts versus zero/single contexts, (c) a CSI by sex interaction term, and (d) an MCS by sex interaction term. Each model was run predicting both Time 1 (concurrent) and Time 2 (longitudinal) adjustment outcomes. In each longitudinal model, a Time 1 control for the criterion variable was entered as a covariate.

In every model except one, experiencing cumulative stress was found to be related to adjustment, confirming the earlier SEM findings (see Tables 2 and

Table 2
Means, Standard Deviations, and One-Way Analyses of Variance (ANOVAs) for Cumulative Stress Index Effects (Time 1 Stress) on Time 1 Adjustment Outcomes

Time 1 Adjustment	Zero stressors		One stressors		Two stressors		Three stressors		Four stressors		Five stressors		Six stressors		ANOVA overall
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Math achievement	55.9	28.6	50.3	28.9	41.6	28.5 ^a	39.9	29.6 ^b	41.4	28.2 ^c	44.1	32.0	32.3	29.6	F(6, 2,470)
<i>n</i>	606		907		491		305		123		39		7		4.25***
Reading achievement	50.8	28.1	43.3	28.8	38.0	27.0 ^a	35.6	27.7 ^b	40.8	28.2 ^c	44.8	32.4	23.7	24.3	F(6, 2,470)
<i>n</i>	607		906		491		305		123		39		7		6.98***
Depression	0.32	0.8	0.49	1.2	0.62	1.4 ^a	1.2	2.2 ^{b,f}	1.1	1.9 ^{c,g}	1.3	2.3 ^d	0.83	0.7	F(6, 2,599)
<i>n</i>	619		966		514		332		135		35		6		7.59***
Aggression	0.85	0.8	1.1	0.8	1.4	0.9 ^a	1.7	1.0 ^{b,f}	2.1	0.9 ^{c,g,i}	2.6	0.8 ^{d,h,k}	2.7	0.9 ^{e,l}	F(6, 2,671)
<i>n</i>	633		990		533		341		138		37		7		35.09***

Note. Complete data only; Post hoc tests: a = 2 > 0 or 1 risk, b = 3 > 0 or 1 risk, c = 4 > 0 or 1 risk, d = 5 > 0 or 1 risk, e = 6 > 0 or 1 risk, f = 3 > 2 risks, g = 4 > 2 risks, h = 5 > 2 risks, i = 6 > 2 risks, j = 4 > 3 risks, k = 5 > 3 or 4 risks. ***p < .001

3 for concurrent and longitudinal CSI means and standard deviations). The CSI was found to be marginally significant in the model predicting Time 2 reading achievement. The hypothesis that multiple context stress would predict variance beyond cumulative stress alone was not supported. In each model, the MCS was not found to be significant, although there were several marginal findings.

In addition, our expectation that cumulative and multiple context stress would result in differential effects for depression (increases for girls) and aggression (increases for boys) was not supported. None of the stress composite by sex interaction terms in the ANOVAs conducted reached statistical significance.

Linear Versus Quadratic Effects of Cumulative Stress on Adjustment

To test for a threshold effect versus a linear effect of stress on adjustment, we ran a series of ANOVAs testing a CSI quadratic term. In each model the quadratic term was found to be significant. For the concurrent adjustment models, quadratic effects for math achievement, $F(6, 2,518) = 17.50, p < .001$, reading achievement, $F(6, 2,519) = 14.85, p < .001$, depression, $F(6, 2,653) = 16.96, p < .001$, and aggression, $F(6, 1,607) = 6.23, p < .001$, were found. In examining these quadratic effects more closely for the concurrent math and reading models, it was found that there was a clear linear decline in children's scores until the level of three stressors was reached, then a leveling off between three and five stressors, and a small group of children performing extremely poorly at the level of six stressors (see Table 2). A similar effect was found for concurrent depression, with a linear increase in depression until the three stressor level and a leveling off at relatively high depression scores between three and six stressors. The concurrent aggression model showed the clearest linear effect up to the level of five stressors, with the leveling off of scores occurring between five and six stressors.

For the longitudinal models, significant quadratic effects for Time 2 math achievement, $F(6, 1,311) = 6.80, p < .001$, reading achievement, $F(6, 1,319) = 2.84, p < .01$, depression, $F(6, 1,390) = 7.55, p < .001$, and aggression, $F(6, 1,607) = 6.23, p < .001$, that paralleled the concurrent relations were found. Examination of the longitudinal models revealed evidence of subgroups of well-adjusted children (see Table 3). In the math and reading longitudinal models, again there was a plateau between three and five stressors, but the quadratic effects were partially a product of two children who experienced six stressors each but who

Table 3
Means, Standard Deviations, and One-Way Analyses of Variance (ANOVAs) for Cumulative Stress Index Effects (Time 1 Stress) on Time 2 Adjustment Outcomes

Time 2 Adjustment	Zero stressors		One stressors		Two stressors		Three stressors		Four stressors		Five stressors		Six stressors		ANOVA overall
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Math achievement	56.1	28.9	48.3	28.6	42.0	28.2 ^a	36.6	26.8 ^b	39.3	29.6 ^c	37.1	30.2	49.5	68.6	$F(6, 1,292)$
<i>n</i>	318		487		264		152		58		20		2		2.76 ^{**}
Reading achievement	49.8	27.2	43.0	27.5	40.0	27.4 ^a	36.9	26.0 ^b	42.4	27.8	35.4	29.7	51.0	67.9	$F(6, 1,299)$
<i>n</i>	324		488		263		151		60		20		2		1.78 [†]
Depression	0.36	1.0	0.54	1.3	0.71	1.5 ^a	1.1	1.9 ^{b,f}	1.3	2.2 ^c	0.44	1.1	0.0	0.0	$F(6, 1,363)$
<i>n</i>	331		521		261		173		68		16		2		4.74 ^{***}
Aggression	0.95	0.88	1.2	0.9	1.6	1.0 ^a	1.9	1.1 ^b	2.0	1.1 ^c	2.3	1.0 ^{d,h}	2.4	0.8	$F(6, 1,579)$
<i>n</i>	393		590		313		193		75		21		3		4.18 ^{***}

Note. Complete data only; post hoc tests: a = 2 > 0 or 1 risk, b = 3 > 0 or 1 risk, c = 4 > 0 or 1 risk, d = 5 > 0 or 1 risk, e = 6 > 0 or 1 risk, f = 3 > 2 risks, g = 4 > 2 risks, h = 5 > 2 risks, i = 6 > 2 risks, j = 4 > 3 risks, k = 5 > 3 or 4 risks. [†] $p < .10$, ^{**} $p < .01$, ^{***} $p < .001$.

were extremely high achievers. Looking at depression, a small number of children experiencing five and six stressors had relatively low depression scores. However, in the longitudinal aggression model the quadratic effect occurred between three and six stressors and appeared to involve variability within a range of relatively high aggression scores.

Discussion

The results of this study highlight the negative consequences of stress exposure on children's development in economically disadvantaged urban settings. Different types of stress across different contexts significantly contributed to children's adjustment difficulties both concurrently and longitudinally. School and family/neighborhood stressors were related to lower reading and math achievement and higher levels of depression and aggression contemporaneously. These stressors also predicted both direct and indirect effects over a 2-year period. Cumulative stress was also related to both concurrent and longitudinal increases in adjustment problems across all domains examined. Children's experience of stress across multiple contexts did not contribute uniquely to children's adjustment difficulties beyond the accumulation of individual stressors alone. However, there was some support for a leveling off of cumulative stress effects at a certain threshold. Contrary to our predictions, these effects did not vary for girls and boys.

Stress and Achievement

Our findings suggest that children's achievement is affected by a host of school, family, and neighborhood stressors, including the child's social and emotional experience while at school, family resources and life transitions, and neighborhood factors such as violence exposure.

Let us first consider the child's social and emotional experience while at school and how this may impact achievement. Looking at the observed relations between peer rejection, victimization, school problems stress, and achievement, it may be that stress associated with strained peer relations, challenges fitting in with the peer group, actual and potential victimization, and worry about events at school contributes to children's anxiety and apprehension. Rather than coming to school full of exuberance and excitement, a child who anticipates negative experiences with the peer group and anxiety about the school experience may approach school with dread, wanting the day to go by as quickly as

possible rather than approaching the day with an interest in learning. These findings are important because they suggest that a child's social and emotional experience while at school can have an immediate effect on his or her achievement.

Not surprisingly, our results for family/neighborhood stress and achievement support the robust literature linking academic difficulties with family poverty and life transitions (Gonzales et al., 1996; McLoyd, 1998). An obvious explanation regarding the poverty-achievement link would be that schools in poor communities have fewer resources, and this lack of resources interferes with academic achievement. However, recall that we measured family poverty as an individual family characteristic based on the child's free lunch status across multiple years. All of the schools in the study were in lower income urban areas and received funding allocations based on the same formula. In this fashion, variation in achievement based on economic disadvantage appears to be linked to individual family resources and associated stressors. Children from the most challenged families in low-income communities performed more poorly on academic indicators than children from more advantaged families in those same communities.

It may be that the lowest income families in poor neighborhoods experience the greatest amount of disruption as they struggle to make ends meet and must struggle to survive rather than to thrive, impeding their ability to facilitate their children's learning, particularly for children who may slip behind and need additional attention. Furthermore, children who witness violence in the context of high-stress and low-resource environments may experience additional emotional turmoil that further interferes with their ability to concentrate and do well at school. Indeed, the combined influence of both family and neighborhood stressors had the strongest total negative effect on children's academic achievement, both contemporaneously and longitudinally. It is interesting that family/neighborhood stressors had both contemporaneous and longitudinal direct negative effects on achievement, whereas school stressors had only contemporaneous direct effects. One possible explanation is that families and communities provide more consistent developmental settings that have longer lasting effects than more transient types of peer relations.

Stress and Depression

Both school and family/neighborhood stress significantly predicted higher levels of concurrent

depression and increases in depression over time, with the strongest effects found concurrently. These findings are consistent with previously cited work connecting school, family, and neighborhood risk factors to children's depressive symptoms. What is unique and interesting about the current findings is that for both school and family/neighborhood stressors only direct effects on children's depression were found. This suggests that, regardless of children's depression levels at Time 1, experiencing these two types of stress in early elementary school portends increases in depression 2 years later.

Although contemporaneous relations between family/neighborhood stress and achievement were stronger than between school stress and achievement, the pattern was reversed when looking at depression as an outcome. In other words, there was a stronger concurrent relation between school stress and depression than between family/neighborhood stress and depression. School stress in the form of negative peer relations and anxiety at school appear to be particularly problematic for emotional adjustment.

Stress and Aggression

Our findings suggest that both school and family/neighborhood stressors contribute to concurrent and future aggression for both boys and girls. This is consistent with extensive previous research that has demonstrated an association between children's aggression and school-related peer problems (Coie et al., 1982; Laird et al., 2001; Little & Garber, 1995), family disruption and poverty (Guerra et al., 1995; Tolan & Loeber, 1993), and neighborhood violence exposure (Attar et al., 1994; Youngstrom et al., 2003).

However, what is particularly striking is the relative contribution of school and family/neighborhood stressors to aggression. In particular, when compared with family/neighborhood stress effects, school stress had greater than five times the effect on concurrent aggression and almost six times the indirect effects on aggression over time. This suggests that school stress is particularly important in the development of children's aggression, both for children who experience more generalized apprehension at school (worrying about grades) and for children who experience the negative side of peer relations. However, as can be seen in Table 1, within the school stress predictors, the concurrent correlation between peer rejection and peer victimization and aggression is about twice as large as the correlation between school problems and aggression, suggesting that negative peer relations play a par-

ticularly important role in the etiology of aggressive behavior during elementary school.

It may be that being disliked and picked on by peers not only increases a child's anger and frustration but also provides opportunities to model the very behavior he or she experiences. In the case of peer rejection, a child may experience more indirect types of social exclusion, as opposed to victimization that involves actual verbal and physical aggression. Still, in both instances, children are observing other children acting mean toward them, and such behavior can be modeled as appropriate within the child's social context. If a child has relatively low peer status, he or she may not be able to "exclude" other children; however, he or she is able to seek revenge and retaliation by increased aggression toward others.

Young children who have relatively little experience coping with stressful circumstances may simply learn to respond to others as they respond to them (a slightly inverted golden rule). This can be further exacerbated in the context of additional school and family/neighborhood stressors. These stressors are likely to reduce both the stability and predictability of the school, home, and neighborhood environment; in turn, this may make it more difficult for young children to learn to regulate their behavior, particularly as they navigate the school environment where increased self-regulation is required.

Cumulative Stress and Multiple Context Stress

The CSI structural models allowed examination of the effects of an accumulation of stressors regardless of the type of stress experienced as per the cumulative risk hypothesis. Cumulative stress was indeed related to concurrent and longitudinal adjustment problems for urban inner city children. The accumulation of stressors, irrespective of their context, was related to small to moderate decreases in achievement, moderate increases in depression, and large increases in aggression. The relatively small effect size for the CSI depression model necessitates caution when drawing conclusions about children's depression outcomes as significant variance is unexplained. However, coupled with the additional post hoc results (see Tables 2 and 3), we begin to get a picture of how the accumulation of stressors across various contexts of urban elementary children's lives can apply significant negative pressure against healthy development, such that only exceptionally adaptive children may emerge unscathed at high levels of cumulative stress.

For all outcomes examined, cumulative stress was related, in a linear fashion, to poorer adjustment

outcomes. For both contemporaneous adjustment and adjustment over time, children's well-being suffered as a function of the number of stressors to which they were exposed. In addition, individual stressor contributions seemed to indicate that the more proximal the stressor, the greater its relative effect with regard to the accumulation of stressor effects for urban school children.

Although we found evidence that single stress factors were individually associated with, and had unique cumulative effects on, children's adjustment problems, our hypothesis that experiencing stress in multiple contexts would contribute uniquely to children's adjustment difficulties beyond the effects of cumulative stress alone was not confirmed. The marginal findings may indicate that the various stress domains may need to be more broadly defined to capture the complexity of each developmental context. Another possibility is that the potential buffering effects of individual protective attributes may need to be accounted for in models aimed at disaggregating multiple context stress effects (Gerard & Buehler, 2004).

Linear and Quadratic Effects

Looking at threshold effects, unexpectedly the quadratic effect identified in the current study involved a threshold beyond which children's negative adjustment was found to plateau. This occurred for both contemporaneous achievement and depression, and for achievement and aggression over time. Thus, our findings suggest a leveling off rather than a marked jump in the effects of stress beyond a certain level (typically beyond three stressors), contrary to much previous research on cumulative risk and adjustment. Perhaps this is evidence of a level of severity in adjustment difficulties beyond which children would be dismissed or failing in school. This adds an additional query to address in research on cumulative risk. However, these findings more clearly support a linear model of cumulative risk illustrated by the distinct incremental increase in adjustment problems paralleling a corresponding increase in stressors.

Limitations of the Current Study

One of the limitations of the current study stems from the limited number of stress indicators available to specify the family and neighborhood stress contexts. Ideally, a more extensive array of stressors in each context would be sampled. This would enhance the reliability of the stressor effects and po-

tentially increase the amount a variance explained in predictive models of cumulative risk. Furthermore, it would be preferable to include children's own reports of how stressful they perceived each stress event to be in addition to having identified that they experienced the stressor. In addition, having multiple reporters for each type of stress would enhance the criterion validity of our predictors. It may be the case that parents' reports of family or neighborhood stress events would be more exhaustive than a child's, thus addressing more complexity in those stress contexts and potentially bolstering our ability to capture the variance associated with children's compromised adjustment.

Implications and Directions for Preventive Interventions

These findings speak to the need for understanding the impact of multiple stressful events across relevant ecological contexts on disadvantaged urban children, and how stressors can significantly compromise development from an early age. Although developmental risk often begins before birth, it is also the case that periods of transition to new contexts (such as the transition to elementary school) create additional risk as children learn to navigate these new settings. As such, it is particularly important to assist children with these transition processes.

On the one hand, the most obvious strategy is to reduce the stressors or risks within and across contexts. Schools certainly can integrate strategies to minimize peer stressors by incorporating programs that discourage harassment and bullying. Multipurpose community centers or school-family programs often focus on building supports in the home, school, and community to facilitate development, thus extending their impact across multiple contexts. This seems particularly important for younger children who are less equipped to cope with stress.

On the other hand, it is likely that some degree of environmental or contextual stress is a reality of life for most children and families. For this reason, it is also important to teach children how best to cope with and manage likely stressors, particularly within high-stress, inner-city communities. Most skill building and prevention programs focus on learning how to get along with others and emphasize skills such as joining a group, solving conflicts, and taking the perspective of others. However, it is also important to incorporate training in coping skills, particularly for children with the highest levels of stress, that address how to manage rejection and victimization, school failure, and lack of support. As our

findings indicate, such efforts will likely benefit children's social and emotional development as well as helping them succeed in school.

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