Contextual Risk, Caregiver Emotionality, and the Problem Behaviors of Six- and Seven-Year-Old Children from Economically Disadvantaged Families

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This study explored the relations between additive and cumulative representations of contextual risk, caregiver emotionality, child adaptability, and teacher reports of the problem behaviors of 6- and 7-year-old children ($N = 155$) from economically disadvantaged families. The results showed relations between both risk representations and child problem scores and provided evidence that the relation for cumulative risk may be moderated by caregiver negative emotionality and caregiver positive emotionality and partially mediated by child adaptability. The results suggest the importance of exploring alternative representations of contextual risk and the conditions under which contextual risk influences child behavior.

INTRODUCTION

Economic disadvantage is associated with a multitude of family factors that pose risks for children's normative development (Chase-Lansdale & Brooks-Gunn, 1995; Fitzgerald, Lester, & Zuckerman, 1995). Poverty cofactors include both contextual variables and more proximal family process variables. The contextual variables shape family interactions over the child's lifetime and include factors such as parent criminality and mental illness, parent educational attainment, and frequent changes of residence. Family process variables influence and reflect immediate parent–child interactions (Dodge, Pettit, & Bates, 1994) and include caregiver emotionality, family conflict, discipline practices, and child temperament.

In this study, we explored the relation between contextual risk and teacher reports of the problem behaviors of 6- and 7-year-old children from economically disadvantaged families. Focal issues concerned the relative usefulness of cumulative and additive factor models of contextual risk in predicting children's problem behaviors, and the moderating and mediating roles of caregiver negative and positive emotionality and child temperamental adaptability. The focus was narrowed to disadvantaged families to explore the diversity among such families (Coll et al., 1996). In studies examining contextual adversity with more heterogeneous samples, the relations among family income and poverty cofactors prohibit a close examination of the wide range of adversity associated with economic disadvantage. In addition, the moderating and mediating functions of caregiver and child variables may differ with economic resources (Baldwin et al., 1993; Deater-Deckard, Dodge, Bates, & Pettit, 1996).

Models of Contextual Risk

An additive factor model of contextual risk examines the unique relations between multiple aspects of environmental adversity and child problem behaviors. Such an approach facilitates the search for relations between individual contextual variables and indexes of specific adjustment problems. For example, Duncan and Brooks-Gunn (1997) found that family income relates specifically to cognitive ability and academic achievement but not to social functioning. Miller and Davis (1997) and Pungello, Kupersmidt, Burchinal, and Patterson (1996) also found specific relations between income levels and child academic achievement. In contrast, mother's years of schooling and family structure relate more strongly to the social functioning of young children (Hanson, McLanahan, & Thomson, 1997; McLanahan & Sandefur, 1994).

Additive factor models have disadvantages, however, in that contextual factors usually do not occur in isolation (Brooks-Gunn, Klebanov, Liaw, & Duncan, 1995; Rutter, 1990; Sameroff, Seifer, & Bartko, 1997), individual factors usually account for a small proportion of the variance in child outcomes (Liaw & Brooks-Gunn, 1994; Sameroff et al., 1997), and power limitations may restrict the number of factors that can be considered simultaneously. In addition, individual factors often lack specificity in distinguishing aspects of social functioning (Fergusson, Horwood, & Lynskey, 1994; Seifer, Sameroff, Baldwin, & Baldwin, 1992).

Cumulative risk indexes may fare better in predicting child maladaptation and serious developmental problems. Cumulative indexes add cofactors (i.e., risk indicators), thereby representing contextual risk with

a single index. The assumption is that child maladaptation varies with the number of factors rather than the type of factor. Thus, the cumulative index approach forfeits identification of specific relations between contextual factors and child outcomes.

Some evidence supports this assumption. For communities in London and the Isle of Wight, for example, Rutter and his colleagues (Rutter, Cox, Tupling, Berger, & Yule, 1975; Rutter, Yule, et al., 1975) found that the presence of two or more indicators of family adversity was associated with a two- to fourfold increase in child behavior problems. Sanson, Oberklaid, Pedlow, and Prior (1991) found a similar result for Australian children, and Fergusson et al. (1994) found a relation between levels of family adversity representing 39 variables and the multiple behavior problems of New Zealand adolescents. Other researchers also have found associations between cumulative risk levels and academic achievement and behavioral adaptation for American children (Brooks-Gunn et al., 1995; Haapasalo & Tremblay, 1994; Luster & McAdoo, 1994; Pungello et al., 1996; Shaw, Vondra, Hommerding, Keenan, & Dunn, 1994; Thornberry, Smith, & Howard, 1997). Sameroff and colleagues (Sameroff, Seifer, Baldwin, & Baldwin, 1993; Sameroff et al., 1997), for instance, have shown that an index representing 10 aspects of family adversity explained up to 50% of the variance in intellectual outcomes and 25% of the variance in measures of social competence for children from the Rochester Longitudinal Study (RLS). In general, the findings from these studies suggest that child maladaptation often is a product of multiple environmental risk factors, and that cumulative indexes may be useful in representing contextual risk when the number of contextual variables is large.

A disadvantage of a cumulative index approach is that the indexes often include indicators representing both contextual variables and proximal process variables. For example, Sameroff et al. (1997) included maternal anxiety when the child was age 4 and maternal interactions with the infant child among the 10 indicators of cumulative risk for 13-year-old outcomes, and Fergusson et al. (1994) included six aspects of childrearing practices in the risk index for adolescent problem behaviors. The limitation of these broad risk indexes is that they are not informative about how contextual adversity translates into child outcomes or about the situations in which cumulative risk may or may not relate to these outcomes. We addressed these issues by narrowing the focus of our cumulative index to the contextual variables alone (e.g., parent antisocial behavior, years of parent schooling, number of residence moves, etc.). Distinguishing between

contextual risk factors and proximal variables enabled examination of processes that moderate or mediate the relation between contextual risk and child outcomes.

Caregiver Emotionality

It is well-documented that potential mediators of the relation between contextual risk and child outcome include caregiver mood, family conflict, and parenting practices. Conger, Patterson, and Ge (1995), McLoyd, Jayaratne, Ceballo, and Borquez (1994), and others (cf. Sampson & Laub, 1994) have shown that the influence of economic adversity on child outcomes is mediated through parent dysphoric mood and conflict among family members. Similarly, Baldwin et al. (1993) argue that caregiver affect is a pathway for the indirect effects of distal factors on child mental health.

For our disadvantaged sample, we focused on caregiver negative and positive emotionality as potential moderators of the relation between cumulative risk and child problem behavior. We hypothesize moderation rather than mediation because we evaluate relatively enduring aspects of caregiver emotionality for families experiencing chronic disadvantage rather than mood dysphoria resulting from a discrete economic downturn. Indeed, for our sample, the life events contributing to contextual risk may represent selective effects of the chronically high negative emotionality of the caregiver (Lorenz et al., 1997).

Our assumption is that emotionality of the caregiver strongly influences the family emotional climate that the child experiences, and frames all caregiver-child interactions (Ackerman, Abe, & Izard, 1998; Izard, 1972; Izard, Libero, Putnam, & Haynes, 1993). Chronic negative emotionality, in particular, provides a hostile and critical context for child behavior (Campbell, Pierce, March, Ewing, & Szumowski, 1994; Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Harnish, Dodge, & Valente, 1995) that may undermine the growth of self-regulatory processes (Cummings & Davies, 1996). This kind of parent variable may dominate other risk factors, especially for economically disadvantaged families (Shaw, Owens, Vondra, Keenan, & Winslow, 1996). Accordingly, we hypothesize that contextual risk may relate relatively weakly to the problem behaviors of children from families with an enduring emotional climate that is intensely negative. Contextual risk may relate more strongly to child behavior in less negative situations.

High positive emotionality, in contrast, may protect children from contextual risk. Gottman and his colleagues (Gottman, Katz, & Hooven, 1996; Wilson & Gottman, 1996) argue that positive emotionality

has an especially strong protective influence for children living in adverse environments, and Baldwin et al. (1993) found that maternal positive affect had a significant influence on outcomes for children from the RLS. A caregiver high in positive emotionality is likely to provide a warm, supportive, and empowering context for children's attempts to control themselves and their environment (Pettit, Bates, & Dodge, 1997). In the present study, evidence for protection from contextual risk would be that the relation between higher cumulative risk and child problem behaviors is muted in the presence of high positive emotionality of the caregiver. Few researchers have examined factors that protect against the influence of cumulative risk (cf. Baldwin et al., 1993; Fergusson & Lynskey, 1996; Seifer et al., 1992) or examined the influence of caregiver positive emotionality on the behavior of children from economically disadvantaged families.

Child Adaptability

Barocas et al. (1991) showed that attentional characteristics mediated the relation between cumulative risk and child outcomes for preschool children from the RLS. Most researchers, however, have not examined the relation between contextual risk and proximal child cofactors. We follow the lead of Barocas et al. by examining the potential mediational role of temperamental adaptability. The logic is based on two assumptions. The first is that adaptability indexes an aspect of self-regulation involving stress reactivity (Rothbart & Ahadi, 1994; Rothbart & Bates, 1997). The second is that chronically stressful and chaotic environments compromise the development of self-regulation processes in young children (Cummings & Davies, 1996; Levine & Wiener, 1989). Thus, temperamental adaptability may be one mechanism linking contextual risk and problem behavior in school.

Research Plan

In this study, we developed a narrow cumulative index of contextual risk for 6- and 7-year-old children from economically disadvantaged families. The goals were to explore the relations among additive factor and cumulative index representations of contextual risk, caregiver emotionality, and child adaptability in predicting teacher reports of children's problem behaviors. Our focal hypotheses were that both representations will account for significant variance in child problem behavior scores, that the cumulative index will distinguish children with serious levels of problem behaviors, and that the relation between the cumulative index and problem behaviors will be moderated by caregiver negative emotionality, and caregiver positive emotionality, and mediated in part by the child's temperament adaptability.

METHOD

Participants

The sample consisted of 155 first-grade children and their caregivers. About 51% of the children were female, 74% were African American, 20% were European American, and 4% were Latin American. The mean age of the children was 84 months (range = 72–91). The primary caregivers were biological mothers of the child (94%) or an adult female relative (usually a grandmother) of the child. All caregivers were native English speakers.

Self-reports by the caregiver showed that the mean family earned income was about $18,000 (SD = $13,900), with a mean per capita income of about $3,300. Family earned income included the estimated earned incomes of all adults living with the primary caregiver. Our families averaged about three children (M = 2.97, SD = 1.54). These statistics suggest that a large proportion of the families in the sample were poor or "near-poor." The 1994 poverty threshold was $15,081 (per capita = $3,770) for a family of three children and one adult, and the threshold was $17,686 for a family of three children and two adults (Hernandez, 1997).

Procedure

Caregivers participated in structured interviews when the children were in preschool and again when they were in first grade. The first-grade interview is the primary source of information about contextual risk for the present study because it probed economic and family history information. We recruited the children and families from eight Head Start centers, and the children attended first grade in 48 elementary schools in northern Delaware. The first-grade interviews took place primarily in the elementary schools and occurred during the months of January through June of 1996 and 1997. Approximately half of the sample participated during each year. Each caregiver completed child and family questionnaires with the help of trained research assistants who read the questionnaires out loud. We completed missing questionnaires by telephone interview. All teacher reports were self-administered and were collected principally through the mail. We paid caregivers $25 and teachers $50 for each child assessment.

Measures of Contextual Risk

Demographic interview. Caregivers participated in a structured demographic interview at the first-grade assessment. The interview consisted of 30 questions requesting such information as residence (i.e., by address) and relationship changes prior to and since the preschool assessment; number and ages of children in the family; number, names, occupations, and estimated earned income of residential adults; and welfare enrollment. We had collected some of the same information at the preschool assessment (except income information) and used the duplicate residence and relationship information as reliability checks. We found few inconsistencies. For example, information about the number of residence changes (by address) prior to the preschool assessment differed between the preschool and first-grade assessments in only four instances. We resolved these inconsistencies by using the information from the preschool report.

Family history interview. Caregivers reported about the family history of psychiatric and behavior problems. The structured interview involved completing a grid with a list behavior problems in the left-hand column and a list of biological relatives across the top row. The behavior problems included learning disabilities, dropping out of school, psychiatric episodes (e.g., clinical depression, schizophrenia), alcohol and drug abuse, and antisocial behavior (e.g., domestic and other violence, thefts). The biological relatives included the index child, biological mother, father, grandparents, and siblings.

Life Events Survey. We obtained information about negative life events from a modified version of the Life Events Survey (Sarason, Johnson, & Siegel, 1978) given at both the preschool and first-grade assessments. This survey consisted of a 33-item checklist about events that may have happened to the caregiver within the six months prior to the survey. For our sample, the most common negative events were the death or serious illness of relatives and close friends (30% and 31%, respectively, for the preschool and first-grade assessments) and job and income loss (35% and 38%, respectively). Other events included marital discord and separation from a relative.

Cumulative risk index. The cumulative index is the number of contextual risk factors derived from the demographic interview, family history interviews, and Life Events Survey ($M = 3.42$, $SD = 1.82$). Each of the 11 indicators has an inclusion criterion, and the score computed for each family reflects the number of indicators for which it met the criteria. The criterion for seven of the indicators was categorical (e.g., present/absent) and was based on developmental theory that identifies the factor as associated with an increased likelihood of behavior problems for children. These indicators are (1) antisocial behavior by a biological parent (antisocial, 43% of the sample), (2) alcohol or drug abuse by a biological parent (alcohol/drugs, 25%), (3) the child having lived with more than one family (families, 16%), (4) psychiatric episodes of a biological parent (psychiatric, 14%), (5) the primary caregiver being a high school dropout (school dropout, 30%), (6) family currently contains a single adult (single parent, 33%), and (7) family currently on welfare (welfare, 46%).

For the four continuous variables, the inclusion criterion was statistical in that it occurred in 25% to 30% of the sample. This criterion is comparable to the mean likelihood of an indicator being present for the categorical variables (30%). The continuous variables are (1) four or more children in the family (children, 26%), (2) a sum of four or more negative life events (i.e., exclusive of the other risk indicators) reported on the two Life Events Surveys given at the preschool and first-grade assessments (negative events, 30%), (3) three or more changes in caregiver intimate relationships during the child's lifetime (relationships, 25%), and (4) four or more changes of family residence (residences, 25%).

Family Measures

Caregiver emotionality. The Differential Emotions Scale (DES-IV; Izard et al., 1993) measured caregiver negative emotionality ($M = 58.66$, $SD = 15.87$) and positive emotionality ($M = 31.4$, $SD = 4.72$). The DES-IV is a self-report questionnaire in which individuals estimate the prevalence of each emotion in their daily lives on 5-point frequency scales. The frequency scales range from "rarely or never" to "very often." The *negative emotionality* composite reflects nine 3-item scales. One scale assessed inner-directed hostility, and eight scales assessed discrete negative emotions including anger, disgust, contempt, sadness, fear, shame, guilt, and shyness. The *positive emotionality* composite reflects three discrete emotion scales that assess the emotions of joy, surprise, and interest. The average two-month test–retest reliability coefficient was .68 for the nine negative affect scales in Izard et al. (1993) and was .67 for the three positive emotions. The correlations for the measures for the preschool assessment and the first-grade assessment (two years later) were $rs = .60$ and .40, $ps < .001$, for the negative emotionality and positive emotionality composites, respectively. In addition, selected aggregates of the negative emotions in the present study also correlated significantly with measures tapping overlapping as-

pects of emotionality. For example, the aggregate of the six scales reflecting anxiety and depressive symptomatology (i.e., sadness, fear, shame, guilt, shyness, and inner-directed hostility) correlated significantly, $r(154) = .59$, $p < .001$) with scores on the Beck Depression Inventory (Beck & Steer, 1987). Similarly, the aggregate of the three scales reflecting hostility (anger, disgust, and contempt) correlated significantly with the hostility/aggression scale, $r(154) = .47$, $p < .001$) on the Zuckerman-Kuhlman 5-factor personality inventory (Zuckerman, Kuhlman, Joiremen, Teta, & Kraft, 1993).

Child adaptability. The Behavioral Style Questionnaire (BSQ; McDevitt & Carey, 1978) provided the measure of child adaptability for the present study. The BSQ contains 112 items that reflect nine empirically derived dimensions of child temperament. One dimension concerns adaptability ($M = 3.16$, $SD = .71$). The caregiver rated the frequency of the child's behaviors on a 6-point Likert scale from "almost never" to "almost always." McDevitt and Carey report a test–retest reliability coefficient of .89 on the BSQ total score. The adaptability scales from the preschool and first-grade assessments correlated significantly, $r(154) = .56$, $p < .001$).

Child Outcome

The total problem behavior score ($M = 37.56$, $SD = 28.08$) on the Teacher Report-Form of the Child Behavior Checklist (CBCL; Achenbach, 1991) was the measure of first-grade problem behaviors. The total problem behavior score reflects the scores on items from scales tapping aggressive behavior, delinquent behavior, withdrawn behavior, anxious/depressed behavior, somatic complaints, social problems, thought problems, and attention problems. We chose the total

problem score because it is a nonspecific measure of child functioning in school, which makes the measure suitable for assessing general relations between contextual adversity and children's school adaptation. Achenbach (1991) reports excellent test–retest reliability for the CBCL, and the bibliography of Brown and Achenbach (1993) includes more than 1000 studies that have used the CBCL in various forms.

RESULTS

Additive Factor Model

Table 1 shows the bivariate correlations among the 11 contextual risk indicators and child total problem scores. The risk indicators are binomial, which means that the correlations may be attenuated somewhat. We explored the additive relations with a hierarchical regression. The first block of variables concerned caregiver negative emotionality, caregiver positive emotionality, and child adaptability; the second block contained the 11 risk indicators. The goal of the block order was to determine the effects associated with the risk indicators after controlling for the proximal family variables. We did not have sufficient power to test for interactions among the risk indicators and proximal variables.

As shown in Table 2, the model was significant, $F(14, 132) = 2.74$, $R^2 = .23$, $p < .01$, and both blocks accounted for significant change in variance. Table 2 also shows the unique effects (i.e., squared semipartial correlations) for each variable. The β values are standardized in this table and the other tables. Alcohol/drugs was the only individual risk indicator accounting for significant unique variance ($R^2 = .02$).

The patterns of intercorrelations in Table 1 and the regression results suggest the possibility that the risk

Table 1   Correlations among the Risk Indicators and Total Problems ($N = 155$)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Antisocial												
2. Alcohol/drugs	.45**											
3. Families	−.06	−.10										
4. Children	−.02	−.01	−.18*									
5. Negative events	.23**	.15*	−.07	−.01								
6. Psychiatric	.20**	.19**	.05	−.14*	.19**							
7. Relationships	.21**	.13*	.04	−.11	.09	.09						
8. Residences	.15*	.11	.12	.08	.18*	.07	.17*					
9. School dropout	.00	.08	.03	.12	.05	−.01	−.12	−.04				
10. Single parent	.00	−.08	−.07	−.05	−.17*	.01	.12	−.07	.00			
11. Welfare	.17*	.00	−.06	.09	−.09	.01	.04	.05	.23**	.18*		
12. Total problems	.32**	.31**	−.03	.00	.22**	.12	.19*	.15*	.13	.01	.10	

*$p < .05$; **$p < .01$.

Table 2   Summary of the Regression of Total Problem Scores on the Proximal Variables and Risk Indicators

Variable	β[a]	sR^2	R^2ch	df	Fch
1 Proximal			.10	3, 143	5.10**
Negative emotionality	.09	.01			
Positive emotionality	−.09	.01			
Child adaptability	.25	.06**			
2 Risk indicators			.13	11, 132	1.99**
Antisocial	.16	.02			
Alcohol/drugs	.18	.02*			
Families	−.05	.00			
Children	−.01	.00			
Negative events	.12	.01			
Psychiatric	−.05	.00			
Relationships	.05	.00			
Residences	.01	.00			
School dropout	.08	.00			
Single parent	.01	.00			
Welfare	.02	.00			
Model			.23	14, 132	2.74**

[a] β values are standardized.
*$p < .05$; **$p < .01$.

indicators co-occurred differentially and that particular groupings of the variables related differentially to children's problem behaviors. We examined this possibility with a principal components factor analysis with a varimax rotation. The results yielded five factors with eigenvalues >1.0. We then regressed children's total problem scores on the factor scores. The regression equation was significant, $F(5, 149) = 6.68$, $R^2 = .18$, $p < .001$, and the results showed that the first factor (i.e., with the highest eigenvalue) accounted for significant unique variance, β = .40, $R^2 = .16$. The variance associated with the other factors ranged from .00 to .02 and was not significant in any case. In the first factor, the item loadings were highest for alcohol/drugs (.77), antisocial behavior (.75), negative life events (.53), and psychiatric episodes (.49). The loadings for the other variables on the first factor ranged from .24 to −.20, though these variables had high loadings on at least one other factor. For example, the loadings of school dropout and welfare, respectively, were .05 and −.08 on the first factor and .77 and .70 on the third factor. This analysis shows that four variables in particular tended to co-occur and accounted for most of the variance in children's total problem scores.

Cumulative Risk Model

The left columns of Table 3 show the numbers and percentages of families at each level of cumulative

Table 3   Number of Families, Mean Total Problem Scores, and Percentages of Children in the Clinical Range for Each Level of Cumulative Risk

Risk Factors	N	%	Mean	SD	Clinical Range	
					n	%
0	8	5.2	21.1	22.9	0	0
1	14	9.0	16.4	16.9	0	0
2	35	22.6	36.1	24.3	8	22.9
3	26	16.8	30.2	23.1	4	15.4
4	21	13.5	37.4	30.2	4	19.0
5	28	18.1	48.2	27.7	9	32.1
6	16	10.3	59.4	30.6	9	56.3
7+	7	4.5	54.7	27.9	3	42.9
Sample	155	100.0	38.1	27.9	37	

risk. We grouped scores of 7 and above as level 7. The fourth and fifth columns show the means and standard deviations of total problem scores for each level, and the right columns show the numbers and proportions (i.e., of the n at each level) of children in the clinical range of total problem scores. The criterion for clinical range is a standardized score (t score) >65. The table shows that higher levels of cumulative risk generally exceeded middle levels, and middle levels exceeded lower levels, in mean total problem scores and in the likelihood of children being in the clinical range.

We tested the apparent relation between cumulative level and more serious levels of problem behaviors in two ways. First, a one-way analysis of variance showed that the cumulative index scores were higher for children in the clinical range ($n = 37$, $M = 4.41$, $SD = 1.71$) than for the other children ($n = 118$, $M = 3.12$, $SD = 1.78$). Second, a discriminant function analysis showed that the risk levels differed significantly in the likelihood of children being in the clinical range, Wilk's $\lambda = .86$, $\chi^2(7, N = 155) = 21.86$, $p = .003$. The canonical correlation overall was .37.

Table 4 shows the correlations among the cumulative index, the proximal variables, and child total

Table 4   Correlations for the Cumulative Risk Index, Proximal Variables, and Child Total Problem Scores

Variable	1	2	3	4	5
1. Cumulative index					
2. Negative emotionality	.18*				
3. Positive emotionality	.01	−.06			
4. Child adaptability	.31**	.29**	−.08		
5. Total problem score	.37**	.16*	−.12	.27**	

*$p < .05$; **$p < .01$.

problem scores. Noteworthy in the table are the significant correlations among the index, child adaptability, and child problem scores. These correlations provide evidence for the feasibility of a mediational hypothesis among the variables.

A hierarchical regression explored the relations among the variables. The first block contained the proximal variables, the cumulative index was second, and the third block contained the terms denoting the interactions of the cumulative index with the emotionality variables. Again the variables were ordered to determine the effects for the cumulative index after controlling for the proximal variables. Table 5 shows the results. The model as a whole was significant, $F(6, 140) = 5.98$, $R^2 = .21$, $p < .001$, and all three blocks accounted for a significant change in R^2 (.10, .07, and .04, respectively).

We interpreted the interactions in the manner recommended by Jaccard, Turrisi, and Wan (1990) for continuous variables. We computed conditional unstandardized β coefficients for the cumulative index at low (-1 SD), medium (the mean), and high ($+1$ SD) values of the moderator variable. The results showed that the values decreased for increasing levels of negative emotionality (respective β values = 25.74, 23.30, and 20.85). This result indicates that the relation between the cumulative index and total problem scores was stronger for lower levels of caregiver negative emotionality than for higher levels. Similarly, the results showed decreasing β values for increasing levels of positive emotionality (respective β values = 16.80, 14.12, and 11.39). This result indicates that the relation between the cumulative index and total problem scores was weaker for higher levels of caregiver positive emotionality than for lower levels.

We tested the hypothesis that child adaptability partially mediated the relation between the cumulative index and child problem behaviors using the method suggested by Baron and Kenny (1986) with three independent regressions. The goals were (1) to show that variable A (cumulative index) relates to variable C (total problem scores), (2) to show that variable A relates to the mediating variable B (adaptability), and (3) to show that the relation of A to C is reduced in the presence of variable B, which also relates significantly to variable C. The results of the first equation showed that the cumulative index related significantly to child problem scores ($R^2 = .14$). The second equation showed that the cumulative index related significantly to child adaptability ($R^2 = .09$). In the third equation, the squared partial correlation coefficients were significant for both adaptability ($R^2 = .03$) and the cumulative index ($R^2 = .09$), but so was the reduction in variance explained by the cumulative index from the first equation (R^2 decrease = .05). These results show covariation among the variables and some support for the partial mediation hypothesis.

DISCUSSION

This study explored the relation between contextual risk and the problem behaviors of 6- and 7-year-old children from economically disadvantaged families. We selected this economically narrow sample with the purpose of exploring the diversity among the families, and because the moderating and mediating functions of caregiver and child variables may differ with economic resources (cf. Baldwin et al., 1993; Deater-Deckard et al., 1996). The results suggest the usefulness of a cumulative index representation of contextual risk. Caregiver negative and positive emotionality may moderate the relation between cumulative risk and child problem behaviors, and child temperamental adaptability may partially mediate this relation.

Contextual Risk

Eleven indicators were used to index contextual risk. The indicators reflected contextual variables occurring over the child's lifetime that could influence family functioning, but they did not include proximal process variables potentially framing parent–child interactions. In this respect, our set of indicators differs from the broader sets employed by Sameroff et al. (1997), Fergusson et al. (1994), and others, that index global environmental adversity.

Table 1 shows that the bivariate correlations among the indicators, and between the indicators and child total problem scores in school, generally were small. The size of these correlations may reflect our

Table 5 Summary of the Regression of Child Total Problem Scores on the Cumulative Risk Index and Proximal Variables

Variable	β[a]	sR^2	R^2ch	df	Fch
1 Proximal			.10	3, 143	5.10**
Negative emotionality (A)	.09	.01			
Positive emotionality (B)	−.09	.01			
Child adaptability (C)	.25	.06**			
2 Risk indicators			.07	1, 142	11.63**
Cumulative index (D)	.28	.07**			
3 Interactions			.04	2, 140	3.44*
A × D	−.73	.02*			
B × D	−1.20	.03*			
Model			.21	6, 140	5.98**

[a] β values are standardized.
*$p < .05$; **$p < .01$.

use of a relatively homogeneous sample of economically disadvantaged families, because the relations among poverty cofactors generally are stronger for more heterogeneous samples (cf. Sameroff et al., 1997). This difference suggests the importance of restricting the sample when exploring the diversity among disadvantaged families. For instance, the correlations suggest that single parenthood and the caregiver being a school dropout pose little unique risk for the children in our sample, though the risk status of these variables is well established elsewhere (cf. Astone & McLanahan, 1991; Duncan & Brooks-Gunn, 1997; McLanahan & Sandefur, 1994; Weinraub & Gringlas, 1995). Perhaps these variables are more normative for economically disadvantaged families than for more advantaged families (McLanahan, 1997; McLoyd, 1998), and the risk is due primarily to the association with income poverty (Brooks-Gunn, Duncan, & Maritato, 1997).

One question of this study concerned how to represent contextual risk for the children of economically disadvantaged families. Adding individual variables and exploring unique effects furthers the important goal of isolating qualitatively distinct sources of contextual risk. The correlations in Table 1 support the feasibility of this approach by showing differences in the relations among the 11 contextual variables and child total problem scores. The approach also gains support from the finding that the risk indicator block (see Table 2) explained a significant and robust proportion of the variance (R^2 = .13) of the problem scores after partialling the variance associated with the proximal variables.

The results also suggest limitations of this additive factors approach. First, only one indicator (alcohol/drugs) accounted for significant unique variance in total problem scores, and even this effect was weak (R^2 = .02). Second, single indicators were not associated with children in the clinical range of total problem scores, as shown in the right columns of Table 3. These results are consistent with the claims of Liaw and Brooks-Gunn (1994) and Sameroff et al. (1997) that individual risk factors lack power in explaining child problem behaviors in general, and usually do not predict serious levels of problem behaviors. Similarly, given the weak variable intercorrelations, the discrepancy of the block effect (R^2 = .13) and the unique variance accounted for by individual variables in the block (R^2 total = .05) provide evidence that child maladaptation varies more with the number of contextual risk factors than with the type of factor. Multiple factors may have synergistic effects in potentiating problem behaviors.

Third, the results suggest that variable reduction strategies may be useful in isolating clusters of risk indicators that co-vary and that relate differentially to child problem behaviors. Such clusters could have practical significance for identifying families most appropriate for means-tested intervention services. Our factor analysis showed, for example, that antisocial behavior, alcohol/drugs, negative life events, and psychiatric episodes had particularly high loadings on one factor. A subsequent regression showed that this factor was far more powerful than the others in explaining child problem behaviors. Given current knowledge, such procedures for variable reduction probably should be exploratory rather than confirmatory because the nature of the variables that cluster together is likely to vary with sample characteristics and with the number and nature of risk indicators. A good case can be made, for instance, for expanding our small set of 11 variables to include community factors, like density of impoverished families, residential instability, and childcare burden (Brooks-Gunn, Duncan, & Aber, 1997; Chase-Lansdale & Gordon, 1996; Coulton, Korbin, Su, & Chow 1995).

Our alternative to the additive factors approach was to cumulate the contextual risk indicators and explore the relation between an index representing the number of indicators, rather than the type of indicator, and child problem behaviors. The results provided two kinds of evidence for the usefulness of a cumulative index. First, the cumulative index performed well in discriminating children with serious levels of problem behaviors. The results showed, for example, that the cumulative index scores differed significantly for children above and below the criterion for the clinical range of problem behaviors. In addition, the likelihood of children being in the clinical range differed with cumulative level, as shown in Table 3. The likelihood was zero for levels with zero and one indicator, and was around 50% for levels with six and seven indicators.

Second, Table 5 shows that the cumulative index accounted for 7% of the variance in total problem scores after partialling the variance associated with the proximal variables. This contribution of the cumulative index was highly significant. Note that this contribution also is somewhat smaller than the contribution of the block of individual indicators (R^2 = .13) for the additive factors model, though larger than the largest unique contribution of any individual indicator (R^2 = .02). In this regard, the cumulative index also may underestimate the relation between contextual adversity and child problem behaviors.

These results are consistent with those of Fergusson et al. (1994), Sameroff et al. (1993, 1997), and others in showing that a cumulative index of environmental adversity accounts for significant and substantial

variance in child and adolescent problem behaviors. The results provide further evidence that child maladaptation usually may be a product of multiple environmental risks (Rutter, 1979), and they suggest that an index representing the number of risk factors may be useful in predicting serious behavior problems. Reducing contextual variables to a single index also is useful in facilitating tests for interactions of contextual adversity with proximal variables, like caregiver emotionality and child adaptability.

Note that Liaw and Brooks-Gunn (1994) and Pungello et al. (1996) also have tested alternative representations of environmental adversity in relation to child problem behaviors, and generally found both advantages and disadvantages of additive factors and cumulative index models. One determinant of the relative advantages may be the number of contextual variables under consideration. Reducing contextual adversity to income and stressful life events, for example, enabled Pungello et al. (1996) to test for interactions as well as for the unique effects of additive factors for an economically heterogeneous sample. A second determinant may be the potential specificity in the relation between individual variables and child outcomes. A single cumulative index forfeits the possibility of identifying specific risk-outcome relations, although smaller indexes representing theoretically derived risk clusters may be useful in this regard (cf. Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999).

Caregiver Emotionality

Our cumulative index differs from those of Sameroff et al. (1993, 1997) and others (cf. Fergusson et al., 1994) in that our narrow index of contextual risk did not include proximal family variables. The empirical importance of distinguishing between contextual and proximal sources of environmental adversity is the potential independence of their contributions to child problem behaviors. Tables 2 and 5 provide strong evidence for this independence, as does the recent study by Deater-Deckard, Dodge, Bates, and Pettit (1998). The theoretical importance is that the distinction enables exploration of the possible mechanisms through which contextual risk may influence child outcomes. We tested two specific hypotheses about caregiver emotionality as a moderator of the relation between contextual risk and child problem behaviors.

The hypothesis about negative emotionality was that the relation between contextual risk and child problem behaviors would be stronger in situations of lower negative emotionality than in situations of higher negative emotionality. Our assumption was that high caregiver negativity would establish a critical and

hostile frame for caregiver–child interactions that would dominate the influence of contextual risk. This assumption was based in part on the claims of Shaw et al. (1996) that caregiver variables dominate in accounting for child behavior problems in disadvantaged families. The significant interaction shown in Table 5 and the interpretation of this interaction provide evidence consistent with our hypothesis.

The hypothesis about positive caregiver emotionality was that high positive emotionality might protect children in situations of high cumulative risk. A factor is protective if it is associated with a reduction in the negative effects of a risk variable. This hypothesis was based on work by Baldwin et al. (1993), Gottman et al. (1996), and Wilson & Gottman (1996), showing that positive emotionality may have an especially important influence on child outcomes in high risk situations; the hypothesis is motivated in particular by the lack of attention to positive emotionality in developmental studies. In support of this hypothesis, we found a significant interaction between the cumulative index and positive emotionality and the interpretation of this interaction indicated that the strength of the relation between the index and problem behavior varied inversely with positive emotionality. Thus, higher positive emotionality tended to mute the influence of higher cumulative risk. This evidence is consistent with the protection hypothesis.

These findings for negative and positive caregiver emotionality have several implications. First, the results suggest the importance of examining possible moderators of the relation between contextual risk and child outcomes. It is critical to determine situations in which contextual risk may or may not have effects and how contextual risk translates to child outcomes. Including proximal variables in a cumulative index limits any analysis of situational variation or translation mechanisms.

The second implication concerns the importance of focusing on caregiver emotionality variables in conceptualizing the interrelations between contextual risk, family processes, and child outcomes. Caregiver emotionality may play a central role in moderating these relations, because it has an enduring influence on all family interactions (cf. Gottman et al., 1996). For example, high negative emotionality may dominate family functioning in that it both causes and reflects changes in intimate partner relationships (a risk indicator), and it provides an overbearing negative climate for child development. Similarly, positive emotionality may play a critical role in framing positive and supporting parenting, which may moderate the relation between family adversity and children's adjustment (Pettit et al., 1997).

We also note two caveats concerning these implications. The first is that caregiver emotionality may influence the extent of contextual risk and vice versa. Such bidirectional effects obscure interpretation of the relations among variables. In the present study with disadvantaged families, the weak correlations between the cumulative index and negative, $r(154) = .18$, and positive, $r(154) = .01$, emotionality suggest that this kind of selection effect was small. The low correlation with positive emotionality, in particular, is consistent with the findings of Diener and Diener (1996) and others (Lykken & Tellegen, 1996) that subjective well being is related weakly to economic adversity and its cofactors.

The second caveat is that the moderating role of caregiver emotionality may specifically concern enduring aspects of emotionality that reflect dispositional variables. The DES-IV measure of emotionality is designed to assess trait emotionality, and indeed the test–retest correlations across two years were .60 for negative emotionality and .40 for positive emotionality. In contrast, the results of studies showing that caregiver negative mood mediates between family adversity and child outcome typically concern more episodic dysphoria resulting from acute environmental events, such as income loss. It is fair to state, however, that a better grasp on why and in what situations caregiver emotionality may function as a moderator or mediator awaits more research.

Child Adaptability

Our hypothesis was that children's temperamental adaptability would partially mediate the relation between cumulative risk and children's problem behaviors. The empirical motivation for this hypothesis comes from the finding of Barocas et al. (1991) that a child variable (attention) mediated the relation between contextual risk and child outcome for children from the RLS. The theoretical motivation derives from the suggestions of Rothbart and Ahadi (1994) and others that temperamental adaptability in particular may index an aspect of self-regulation involving stress reactivity, and that the development of self-regulation processes may be impaired by chronically stressful and chaotic environments. Thus, temperamental adaptability may provide one link between contextual risk and problems of behavior regulation in school.

Our results provide some support for a partial mediation hypothesis. In particular, the three regressions suggested by Baron and Kenny (1986) showed that the cumulative index significantly predicted child problem scores, the index significantly predicted child adaptability, and both the index and adaptability significantly predicted child problem scores when entered together. Most important, the cumulative index showed a significant reduction in the variance explained in the first and last equation. The equations establish covariation among the variables and provide some evidence that adaptability partially mediated the relation between the cumulative index and child problem scores. Although the mediating effect was weak at best, the results have theoretical importance in identifying a possible mechanism linking contextual risk to child problem behaviors and demonstrating the need for more research on this topic.

Finally, it is important to note some general limitations of this study. One is that our family history information reflects retrospective reporting by the caregiver. In addition, the status of the information was not qualified in terms of chronicity or recency. A second limitation is that information on all the variables except the outcome variable (i.e., teacher reports of problem behaviors) came from the same informant. This procedure could have affected the unique variance in problem behaviors explained by each variable. Third, the analyses do not permit causal conclusions, and it is likely that child problem behaviors, temperamental adaptability, and caregiver emotionality play some role in eliciting the events comprising the risk indicators. Finally, our sample is mostly composed of African American families, and sample size limited our ability to test for ethnicity differences in the relations between contextual risk and problem behaviors. Thus, our results lack demonstrated generality, and are most appropriate in reference to African American families.

In summary, the results showed that the extent of contextual adversity predicts the problem behaviors in school of 6- and 7-year-old children from economically disadvantaged families, and that a cumulative index may be a particularly useful representation of contextual risk in some situations. Proximal process variables involving caregiver negative and positive emotionality moderated the relation between the cumulative index and child problem behaviors, thus providing evidence about situations in which contextual risk may or may not influence child behavior. A child variable provided evidence about another mechanism of influence in that temperamental adaptability partially mediated the relation between the cumulative index and problem behaviors.

staffs of the many elementary schools that contributed to the research.

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