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Predicting Developmental Outcomes at School Entry Using a Multiple-Risk Model: Four American Communities

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Abstract

The contributions of different risk factors in predicting children's psychological and academic outcomes at the end of 1st grade were examined. Using a regression model, levels of ecobehavioral risk were assessed in the following order: specific demographics, broad demographics, family psychosocial status, mother's depressive symptoms, and neighborhood quality. Participants were 337 families from 4 American communities. Predictor variables were assessed in kindergarten, and teacher, parent, and child outcomes (behavioral and academic) were assessed at the end of 1st grade. Results indicated that (a) each level of analysis contributed to prediction of most outcomes, (b) 18%–29% of the variance was predicted in outcomes, (c) a common set of predictors predicted numerous outcomes, (d) ethnicity showed little unique prediction, and (e) the quality of the neighborhood showed small but unique prediction to externalizing problems.

From an ecological perspective (Bronfenbrenner, 1979), early childhood development occurs within the multiple contexts of the home, the school, and the neighborhood, and aspects of these environments can contribute to the development of adjustment problems. Thus, the study of adjustment must be embedded in analyses of the contextual risks to which children are exposed (Sameroff & Seifer, 1990). Risk factors such as low socioeconomic status (SES); single-parent family status; ethnic minority status; family history of psychological, substance use, and legal problems; marital discord; and lack of social support have all been shown to be related to an increased likelihood of psychological problems in children (Liaw & Brooks-Gunn, 1994; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987; Yoshikawa, 1994).

Not all children raised in such contexts develop adjustment problems, however (Cowen et al., 1992), and no one factor alone accounts for children's adjustment problems (Sameroff & Seifer, 1990). Studies of multiple risk factors indicate that an increase in the number of risk factors experienced by a child results in an increased likelihood of that child developing adjustment

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problems (Rutter, 1979). Therefore, in predicting children's psychological adjustment, it is important to consider the effects of multiple risk factors within a theoretical model. Indeed, all risk factors do not have equivalent meaning, and they may represent varying levels of conceptualization. In the present study, the combined effects of demographic, family psychosocial, and neighborhood risk factors on children's development were examined in families from four American communities. The present study involved a test of the hierarchical and unique contributions of three major dimensions of social context on the behavioral, academic, and psychological outcomes of a culturally and geographically diverse combination of child populations.

Demographic Risk Factors

Low family SES places children at risk. Children in low-SES families demonstrate higher levels of both externalizing and internalizing problems (Dodge, Pettit, & Bates, 1994; Shaw, Keenan, & Vondra, 1994) and academic difficulties (Walker, Greenwood, Hart, & Carta, 1994). Low SES may increase the stress experienced by a family as well as result in diminished resources (Conger, Ge, Elder, Lorenz, & Simons, 1994), and it may indirectly influence child rearing through mediators such as parental discipline practices or parental warmth and acceptance.

Certain ethnic minorities have increased risk of psychological problems in contemporary American society, African American children are at greater risk for problems due to cumulative effects of systematic negative attributions and inequities of racial discrimination and prejudice (Gibbs, 1988; Ogbu, 1985; Spencer, 1990). This risk is reflected in higher levels of behavior problems and lower levels of academic achievement (Gibbs, 1989; Hare & Castenell, 1985; Patterson, Kupersmidt, & Vaden, 1990). Moreover, African American children experience risk because of their disproportionate probability of being persistently poor (Duncan, Brooks-Gunn, & Kiebanov, 1994; McLoyd, 1990) or of living in high-risk neighborhoods (Duncan et al., 1994; Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995). Interrelations among these various contextual risk factors need to be "unpacked" in order to understand the unique contribution each makes to child functioning (Myers, Taylor, Alvy, Arrington, & Richardson, 1992). For example, Dodge et al. (1994) observed that, for numerous socialization processes and conduct problem indexes, race did not add unique contributions to differences accounted for by SES.

SES and ethnicity also may be markers for more specific demographic factors, such as a single-parent family structure, family size, and mother's age at childbirth, which have been found to relate to children's adjustment. For example, children raised in single-parent households are more likely to demonstrate adjustment problems such as immaturity, internalizing and externalizing problems, and academic difficulties (Amato & Keith, 1991; P. Cohen & Brook, 1987; Compas & Williams, 1990; Thomson, Hanson, & McLanahan, 1994). Larger families may experience greater demands on resources and less individual parental attention for each child, and the number of children in a family has been found to relate to academic achievement and delinquent behaviors (Wagner, Schubert, & Schubert, 1985). The mother's age at the time of childbirth also has been found to predict children's psychological problems (Brooks-Gunn & Furstenberg, 1986). Young mothers are more likely to have had difficulties in school, to experience emotional difficulties, and to live in poor neighborhoods, which may affect their parenting abilities (Chase-Lansdale, Brooks-Gunn, & Zamsky, 1994). At present, it is unclear what role macro-demographic variables such as race and SES play in child outcomes when more specific demographic variables are also considered. In addition, there has been little differentiation of the effects of parental education and parental occupation within the larger construct of SES.

Family Psychosocial Risk

Family risk factors include negative life events, marital problems, quality of social support, and quality of the physical environment. Family stress, as indicated by negative life events, has been found to predict children's aggression and externalizing problems, internalizing problems, social adaptation, and intellectual functioning (Attar, Guerra, & Tolan, 1994; Barocas, Seifer, & Sameroff, 1985; Myers et al., 1992; Pianta & Egeland, 1990). Marital distress has been associated consistently with internalizing and externalizing problems in children. (Conger et al., 1994; Depner, Leino, & Chun, 1992; Emery, 1982; Katz & Gottman, 1993; Shaw et al., 1994). Children's exposure to marital conflict, spousal physical aggression, and child-rearing disagreements all may play a role in children developing adjustment problems (Jouriles, Murphy, & O'Leary, 1989; Lahey et al., 1988). Parents' social support systems may influence their ability to handle stress and their parenting practices (Hashima & Amato, 1994; Jennings, Stagg, & Connors, 1991; Myers et al., 1992), which in turn affect children's well-being. Parental social support is also directly related to children's psychological adjustment and cognitive performance (Guidubaldi, Perry, & Nastasi, 1987; Melson, Ladd, & Hsu, 1993).

The physical environment of the home also may play a significant role in children's well-being. The provision of learning stimulation, an adequate play environment, and physical safety have been related to internalizing and externalizing problems, as well as to academic functioning (Elardo & Bradley, 1981; P. Cohen & Brook, 1987; Dubow & Ippolito, 1994; Duncan et al., 1994). Richters and Martinez (1993) reported that the stability and safety of the home was a more important predictor of adaptational success or failure than was exposure to community violence.

Maternal depression (Canino, Bird, Rubio-Stipec, Bravo, & Alegria, 1990; Myers et al., 1992; Shaw et al., 1994) has also been related to psychopathology in children. Maternal depression is often considered an index of the current family psychosocial environment. However, it is important to examine whether a mother's depressive symptomatology predicts child adjustment over and above the predictive value of current family psychosocial context (i.e., to disentangle the effects of depression per se from other common-cause family risk factors).

Neighborhood Risk

Burton, Price-Spratlon, and Spencer (1997) emphasized the importance of understanding the different meanings of neighborhood context and their relation to developmental outcomes. Neighborhood, as measured by social address (Bronfenbrenner, 1986), reflects physical or demographic properties, whereas perceptions of neighborhood capture residents' personal evaluations of their social milieu. Neighborhood can also be conceived of as social networks, as well as subcultures, with shared social practices and beliefs. Wilson (1991) proposed that each of these aspects of neighborhood influences the socialization process for children. Sampson and Groves (1989) demonstrated the importance of networks, residential stability, and other community structure variables on violence and delinquent behavior. Levels of neighborhood poverty and crime and concentrations of lower income families have been related to higher levels of stress, exposure to violence, child maltreatment, parents' mental health, and child psychological adjustment (Attar et al., 1994; Duncan et al., 1994; Lindgren, Harper, & Blackman, 1986; Melton, 1992; White, Kasl, Zahner, & Will, 1987). However, many studies measure only one aspect of the neighborhood construct. As Burton et al. (1997) have noted, each construct has its strengths and its limitations. Thus, in the present study, the quality and social aspects of the neighborhood were measured using both participant perceptions and objective ratings of the neighborhood.

Child's Gender as a Moderator of Contextual Impact

Several studies have demonstrated that boys are more vulnerable than girls and that boys have more adjustment problems (Duncan et al., 1994; Joffe, Offord, & Boyle, 1988; Simcha-Fagan, Gersten, & Langner, 1986). It is possible that boys and girls have different interactions with their social context and that risk factors affect boys and girls differently (Bolger, Patterson, Thompson, & Kupersmidt, 1995; Myers et al., 1992; Vaden-Kiernan, Ialongo, Pearson, & Kellam, 1995; Zaslow & Hayes, 1986). There is some evidence that boys and girls have different developmental pathways to externalizing problems (Shaw et al., 1994); however, there have been few direct tests as to whether contextual risk factors affect boys and girls differently. The possible role of gender as a moderator of risk was tested in the present study.

Impact of Multiple Risk Factors

Multiple- or cumulative-risk models of development reflect the assumption that children's developmental outcomes are better predicted by combinations of risk factors than by individual factors alone. Multiple-risk studies allow for tests of ecological models in which both psychological processes and environmental risk factors are jointly considered in predicting children's developmental outcomes (Elder & Caspi, 1988; Sampson & Laub, 1994).

One example of the multiple-risk model is found in the longitudinal study by Werner and her colleagues (Werner, Bierman, & French, 1971; Werner & Smith, 1982), in which the effects of multiple risk factors on children's intellectual development and psychological symptoms were investigated using a large community sample. Their findings in middle childhood and adolescence indicated that children who experienced high levels of both perinatal and environmental risk showed significantly worse cognitive and behavioral outcomes. In the Rochester Longitudinal Study, a multiple-risk index that included 10 risk factors reflecting the psychological functioning of the mother, family SES, minority status, interaction style, family support, life events, and family size, significantly predicted children's IQ and social-emotional competence better than any single risk factor alone, and the effects could not be accounted for by any particular subset of the risk factors (Sameroff et al., 1987). Liaw and Brooks-Gunn (1994) tested the effects of 13 risk factors on young children's IQ scores and behavior problems and found that as the number of the children's risk factors increased, IQ scores decreased and the incidence of behavior problems increased.

In most multiple-risk studies, the presence of risk factors is assessed, and a sum of the number of risk factors present is computed. One difficulty with this approach is that some risk factors might be better construed as continuous variables rather than as dichotomous variables, and important information may be lost or associations with other variables may be less likely to be detected (J. Cohen & Cohen, 1983). A second difficulty with the treatment of multiple risk in the literature is that the emphasis is on number of risks as opposed to types of risks having particular consequences. In addition, summing the number of risk factors weights all risk factors equally and does not take into account relative contribution or overlap in risk factors (cf. Szatmari, Shannon, & Offord, 1994). Although there is relatively little theoretical structure to guide the organization of types of risks, Bronfenbrenner's (1992) ecological model of concentric fields of risk influence provides a basis for distinguishing risks that operate within the family context and those coming from the neighborhood or community.

A different approach to analyzing multiple risk factors would be to distinguish between neighborhood and family risk factors on the one hand and between these two variables and demographic variables that may be highly correlated with both neighborhood and family context variables on the other hand, using hierarchical multiple regression. The effect of individual variables on outcomes can be assessed using standardized regression coefficients,

and the cumulative effect of risk factors can be assessed using the increment in proportion of variance accounted for by adding variables to the model. In addition, the relative contribution of each risk factor, or sets of risk factors, can be assessed.

Present Study

In the present study, the goals were to understand the relative contribution of risk factors, as well as to assess the total proportion of variance in children's psychological and academic outcomes that could be accounted for by the different types of risk factors. The analyses, using hierarchical regression, are based on testing a theoretical model that has a number of dimensions that map onto Bronfenbrenner's (1992) ecological model. First, the model examined processes that are more proximal prior to those that are more distal. Thus, we addressed the question of whether the neighborhood variable predicts outcomes after demographic and family psychosocial variables have been taken into account. Second, we examined whether specific demographic factors (family size, maternal age, and single-parent status) may account for variance often associated with SES (education and occupation) and ethnicity and what additional variance SES and ethnicity may account for after these variables have been considered. Third, we examined the relation between ethnicity, SES, specific demographic indexes, and neighborhood quality to see what role race may play when these other risk factors are also considered. Fourth, we examined whether family psychosocial risk variables account for variance in children's symptomatology over and above commonly studied demographic risk variables. Fifth, we tested for the impact of mother's report of depressive symptoms after other dimensions of family psychosocial context had been considered. Sixth, we explored whether site differences would be accounted for by demographic and neighborhood-level variables. We then examined the unique variances of each of these variables after all had been entered into the equation; thus, we tested both the hierarchical model and the final contribution of domains. Finally, we used structural modeling to examine the direct effects of neighborhood and SES variables as well as possible mediating pathways.

To assess these questions adequately, comprehensive and reliable measures of contextual risk are needed. In this study, multiple measures, assessing a wide range of aspects of the environmental context, were used. Multiple sources of construct information on each were used when possible. Data were collected on a large sample of parents and children from four different communities, and participants were carefully selected to represent a broad range of children's adjustment problems. Although some studies of risk factors have selected representative samples (Vaden-Kiernan et al., 1995; Werner et al., 1971), recent studies of urban populations have used convenience samples, with low volunteer rates ranging from 16% to 30% of the population (Myers et al., 1992; Wyman, Cowen, Work, & Parker, 1991).

An additional strength of this study is that children were assessed in early childhood, at the time of school entrance. It has been suggested that school entrance and the first years of school are critical developmental periods, at which time children may be at greater risk for developing adjustment or academic difficulties (Clancy & Pianta, 1993; Kellam et al., 1991). This makes the transition into school an opportune point at which to examine the influence of contextual risks on children's adjustment.

Method

Participants

Participants in this study were 337 parents and children who were participants in a longitudinal multisite investigation of the development and prevention of conduct problems in children. The details of this investigation have been described elsewhere (Conduct Problems Prevention Research Group, 1992). Participants were selected from four areas of the country, each

representing a different cross section of the American population: (a) Durham, North Carolina, an inner area of a small city with a large low- to middle-SES, single- and two-parent, African American population; (b) Nashville, Tennessee, a moderate-sized city with a mix of low- to middle-SES, single- and two-parent, African American and Caucasian families; (c) Seattle, Washington, a moderate-sized city with a low- to middle-SES, ethnically diverse population, including Caucasians, African Americans, Asian and Pacific Islanders, Chicano–Latinos, and Native Americans; and (d) Central Pennsylvania, a mostly rural area with low- to middle-SES, two-parent, Caucasian families. Within each site, schools with known high rates of children at risk for the development of conduct problems were identified (Lochman & Conduct Problems Prevention Research Group, 1995).

As part of the intervention study design, a normative sample of children was selected from the comparison schools. From these schools, 100 kindergarten children were selected at each site (87 in Seattle because one school dropped out of the study in the first year) on the basis of their race, gender, and level of teacher-reported behavior problems. The normative sample of 100 children from each site was selected by including 10 children from each decile of the distribution of scores on a teacher-report screen for behavior problems, which consisted of items from the Teacher Observation of Child Adaptation—Revised study (TOCA–R; Werthamer-Larsson, Kellam, & Wheeler, 1991). The larger sample consisted of 387 participants; however, 50 participants were eliminated in the present study as a result of missing data on one or more of the measures included in this study.

Across all sites, the mean age of the children in the first year of this study was 6 years 4 months ($SD = 5$ months), and the sample was 52% boys, with 47% of the sample from an ethnic minority background (43% African American and 4% other). In all, 89% of the Durham sample, 52% of the Nashville sample, 1% of the Pennsylvania sample, and 49% of the Seattle sample were ethnic minorities. A total of 42% of the sample (60% in Durham, 57% in Nashville, 13% in Pennsylvania, and 38% in Seattle) were single parents. The modal Hollingshead (1979) SES indicator (range = 1 to 5, with 5 as lowest SES) was 5 (5 in Durham, 5 in Nashville, 5 in Pennsylvania, and 3 in Seattle). The mean number of siblings in the sample was 1.7 ($SD = 1.2$), and the mean age of the mothers at the target child's birth was 24.4 years ($SD = 5.3$ years).

Procedure

The goal of the present study was to predict children's psychological and academic outcomes at the end of first grade. Teacher reports of children's adjustment were obtained in interviews with teachers in the late spring of children's first-grade year. Parent reports of children's adjustment and children's performance on academic testing were collected in the summer following first grade during home interviews with the primary residential parent; 88% of the parents interviewed were the biological mother. The majority of the risk factors were assessed during the spring of the kindergarten year or the summer prior to first grade. Parent reports on risk factors were collected in home interviews in the summer prior to children entering first grade. Parent reports of life changes experienced by children during first grade were obtained in the summer following children's first-grade year.

Measures

Contextual risk indexes were constructed to reflect demographic, family psychosocial, and neighborhood factors that were believed to place children at risk for developing adjustment and achievement problems. The risk indexes were developed using multiple indicators of risk from different measures and, when possible, different reporters. First, the individual measures used to assess risk are reviewed briefly, followed by the procedures used to construct the summary risk indexes.

Demographic variables—SES was divided into two conceptually distinct variables: education and current occupation. Education was assessed by the number of years of education of the head of household (mothers in mother-headed families and the mean of mothers and fathers in two-parent families). Similarly, occupation was assessed using the Hollingshead (1979) 9-point categorization system of the head of household (mothers in mother-headed families and the mean of mothers and fathers in two-parent families). Information about the target child's race, number of the target child's siblings, single- versus two-parent family status, and the mother's age at the birth of the target child was obtained from the parent Households in which the parent was not married but had a live-in partner who had resided there for the past 12 months were considered two-parent households.

Family psychosocial—The Life Changes Scale, developed for this project, is a 16-item measure that assesses major life stressors that were experienced by the target child during the previous year (e.g., move, medical problems, death, divorce, or financial problems). This measure was obtained in the parent interviews following the end of first grade. A sum of the items experienced was computed reflecting life events occurring during the target child's first-grade year.

The 13-item measure of Family Emotional Expressiveness is a revised version of the 40-item Family Expressiveness Questionnaire (Halberstadt, 1986). This parent-report measure assesses the nature and frequency of the family's communication of both positive and negative emotional states. In the present study, principal-components analyses were conducted on the revised scale, and two factors emerged. They were labeled *Negative Expression* (6 items; e.g., How often does someone in your family tell other family members when something is bothering them?) and *Positive Expression* (7 items; e.g., How often does someone in your family try to cheer up another family member who is sad?). A mean-weighted sum score was calculated for each dimension, and each scale was considered missing if 25% or more of the items on the scale were missing. A total score was calculated as the mean of the Negative Expression and Positive Expression scores ($\alpha = .87$).

Social support—Social support was assessed by two subscales: Friendship Support ($\alpha = .77$) and Family Support ($\alpha = .67$) from the 38-item Inventory of Parent Experiences (IPE; Crnic & Greenberg, 1990). Scores were the mean of items on each subscale. Subscales were considered missing if 25% or more of the items on a subscale were missing.

Marital distress—Marital distress was measured by a 28-item adaptation of the 32-item Dyadic Adjustment Scale (Spanier, 1976). This widely used measure has a high internal consistency ($\alpha = .96$). The total score was considered missing if 25% or more of the items on the scale were missing. A cutoff score of 88 was used for marital distress. (Typically, scores less than or equal to 97 are considered indicative of marital distress. However, as a result of excluding 4 items with sexual content from the scale, the cutoff was lowered to compensate for the 6-point, 5-point, and 2-point [2 items] response scales of the excluded items. That is, the value of the midpoint of each scale was subtracted from the standard cutoff score.) Eighteen percent of the two-parent families obtained scores at or below 88, indicating marital distress. A dichotomous score was created, with nondistressed respondents receiving a score of 0 and distressed respondents receiving a score of 1. In order to include all of the participants, single-parent families were given a score of 0 on this measure.

Mother's depression—Maternal depression was assessed using the Center for Epidemiological Studies—Depression scale (CES-D; Radloff, 1977). The scale was designed to measure the major components of depressive symptomatology, and respondents were asked to rate the frequency of each of 20 symptoms experienced in the previous 7 days on a 4-point

response scale. Scores on the CES-D were the sum of the 20 items. The scale was considered missing if 25% of the items on the scale were missing.

Physical environment of the home—Subsequent to completing interviews with the families, the parent interviewer completed the Post-Visit Inventory (PVI; Dodge, Bates, & Pettit, 1990), which reflected the interviewer's impressions of the physical environment in the home and neighborhood. Principal-components analysis of items resulted in two factors that were labeled *Home Environment* ($\alpha = .66$; e.g., How clean is this dwelling? How many rooms are in this dwelling?) and *Neighborhood Environment* ($\alpha = .78$; e.g., How safe is the area outside of this dwelling? How is the noise level in the neighborhood around this dwelling?). In addition, a conceptually derived scale reflecting Child-Friendly Home Characteristics ($\alpha = .76$; e.g., child has an indoor play area; age-appropriate toys and games are available to the child) was computed. Mean-weighted sum scores were calculated for each scale, and subscales were considered missing if 50% or more of the items on the scale were missing. Two interviewers were available for the majority of visits, and interrater reliability was assessed using the intraclass correlation coefficient (Shrout & Fleiss, 1979). Reliabilities were as follows: Home Environment, .85; Child-Friendly Home Characteristics, .57; and Neighborhood Environment, .88.

Neighborhood context—Objective ratings of the quality of the neighborhood were obtained using interviewers' reports on the Neighborhood Environment subscale from the PVI (described above). The participants' perception of the neighborhood was assessed using the Neighborhood Questionnaire (NQ), developed for this study to assess the quality of the family's neighborhood in terms of safety, violence, drug traffic, satisfaction, and stability. The 13 items from this parent-report measure were submitted to a principal-components analysis, and three factors with eigenvalues greater than or equal to 1 were extracted. The factors were labeled *Neighborhood Safety* ($\alpha = .77$; e.g., How often are there problems with muggings, burglaries, assaults, etc.? How much of a problem is the selling and using of drugs around here?), *Neighborhood Social Involvement* ($\alpha = .74$; e.g., How many of your neighbors do you know well enough to visit or call on? How often do you get together with any of your neighbors?), and a 2-item scale on *Satisfaction With Public Services* (e.g., How satisfied are you with the public transit around here? How satisfied are you with the schools around here?). Scores were the mean of the items on each subscale, and subscales were considered missing if 25% or more of the items on the scale were missing (except for the Satisfaction With Public Services subscale, with 2 items, for which a 50% criterion was used).

Risk indexes—The measures were grouped conceptually into domains of specific demographic risk factors, macrodemographic factors, family psychosocial risk, and neighborhood risk factors. When there was more than one measure of a construct (i.e., social support, home environment, and neighborhood context), scale scores were standardized, and composite scores were calculated by computing the mean of the measures. Risk indexes were scored in the direction of higher scores reflecting greater risk. Specific demographic risk included single-parent status, number of siblings for the target child, and the mother's age at the time of the target child's birth. The broader demographic risk factors were parents' occupation, education, and race of the target child. Family psychosocial risk included life changes experienced by the target child, family expressiveness (higher scores indicate less expressiveness), marital distress, parental social support (a composite of the Friendship Support and Family Support subscales of the IPE; $\alpha = .64$; higher scores indicate less support), and the quality of the physical home environment (a composite of the Home Environment and Child-Friendly Interior subscales of the PVI; $\alpha = .63$). Maternal depression, although considered to be one aspect of the family psychosocial context, was examined separately to determine its impact beyond the specific ways it might be reflected in the psychosocial environment of the

home. Neighborhood risk consisted of a single factor that was a composite of the Neighborhood Environment subscale of the interviewer-report PVI and the Neighborhood Safety subscale of the parent-report NQ ($\alpha = .66$; the Satisfaction With Public Services subscale of the NQ did not correlate strongly with the other measures of neighborhood quality and detracted from the internal consistency of the scale; the Social Involvement subscale of the NQ was excluded because of its potential confound with the social support measures).

Children's Outcomes

Multiple measures of children's symptoms were used, and both parent and teacher reports were obtained. Four general domains of symptoms were assessed: externalizing problems, internalizing problems, social competence, and academic achievement.

Externalizing problems—Parent report of externalizing problems was obtained using the Externalizing Problems *T* score from the Child Behavior Checklist (CBCL; Achenbach, 1991) during the summer following first grade. First-grade teachers completed the TOCA-R in the spring (Werthamer-Larsson et al., 1991). The TOCA-R yields two internally consistent factors ($\alpha s > .85$). The Authority Acceptance subscale of the TOCA-R (10 items) assesses oppositional and conduct problem behaviors (e.g., takes property, breaks rules, teases, and is disobedient). The Cognitive Concentration subscale (12 items; $\alpha = .97$) assesses children's difficulties with concentration, attention, and work completion. The scales are scored in the direction of higher scores reflecting greater behavior problems.

Internalizing problems—The Internalizing Problems *T* score from the parent-report CBCL was used (Achenbach, 1991).

Social competence—Teachers reported on the child's social competence using the Social Health Profile (SHP; Conduct Problems Prevention Research Group, 1997), which assesses prosocial and emotion regulation skills. The SHP includes nine items describing prosocial behaviors and emotion regulation. Items are rated on a 6-point scale and are summed to create a total score for social competence ($\alpha = .87$).

Academic achievement. T—scores on the Letter-Word Recognition and Calculation subscales of the Woodcock-Johnson Psycho-Educational Battery—Revised (WJ-R; Woodcock & Johnson, 1989–1990) were used as measures of children's verbal and nonverbal academic performance, respectively. This test was administered in the summer following first grade.

Results

Intercorrelations Among the Risk Factors and Outcomes

The intercorrelations among the risk factors are presented in Table 1. There were moderate correlations among some of the risk factors, such as occupation, education, racial minority status, mother's age at the birth of the target child, single-parent status, home environment, and neighborhood environment. The mildly significant negative relations between marital distress and both race and single parenting were an artifact of the coding decision regarding marital distress for single parents. The intercorrelations among the child outcomes are displayed in Table 2. The correlations within source were fairly strong, whereas the correlations across source were moderate to low, even within construct, although reading achievement was reasonably strongly correlated with cognitive concentration (scored so that higher scores reflect greater problems with concentration; $r = -.49$). In multiple regression analyses reported below, the risk factors were investigated for their hierarchical and unique contributions to children's outcomes.

Least squares regression assumes multivariate normality in the distribution of the variables included in regression models; however, estimates are robust to modest departures from multivariate normality (Kenny, 1979). Univariate measures of distribution, skewness, and kurtosis for each variable in the present study were inspected for major deviations from normality. In the present study, absolute values of skewness ranged from 0.08 to 2.64. Absolute values of kurtosis ranged from 0.03 to 5.03 (highest values of skew and kurtosis were for the measure of marital distress). Overall, these values did not represent major deviations from normal distributions. As an indication of the general level of disorder in the sample, the mean parent-reported externalizing score was 53.6 and internalizing score was 53.3, just slightly above the standardization means for the CBCL.

Multiple Regression Models

Multiple least squares regression models were used to test the prediction of children's functioning by the set of risk indexes. Separate regressions were conducted for each outcome variable, and thus, the number of participants included in each regression model varied (N s ranged from 332 to 337). Risk indexes were entered into the regression model in a predetermined, hierarchical order, with specific demographic variables in the first step; occupation, education, and race entered in the second step; family psychosocial and mother's report of depressive symptoms entered in the next two steps; quality of the neighborhood environment entered in the next; and study site entered in the last step. This order of entry addressed the questions discussed in the introduction. The variables comprising these categories are described in the left-hand column of Tables 3–5. The findings on parent report of behavior are found in Table 3, teacher-reported outcomes are found in Table 4, and child achievement test scores are found in Table 5. In each table, the first column shows the zero-order correlations of the risk factors with outcomes, the second column reports standardized regression coefficients at entry into the model, the third column lists the total R^2 that indicated the cumulative proportion of variance for the model at the particular step (cumulative R^2), and the fourth column (last step) is the standardized beta for the individual risk factors that remain significant when controlling for the entry of all other risk factors. The last column (Unique) includes a calculation of the proportion of unique variance accounted for by each major domain when all other domains are controlled in the model. The results are discussed in terms of the significance of the risk factors across the different domains of functioning.

In general, between 18% and 29% of the variance in outcomes was predicted by the entire set of variables. Specific questions of this study were examined by steps in the analysis that revealed the predictive strength of different categories of context, either independently or above and beyond the significance of particular other categories. The first question addressed was whether the neighborhood variable predicted outcomes after demographic and family psychosocial variables had been taken into account. Neighborhood added significantly to the prediction of parent-report externalizing and the teacher report of authority acceptance and social competence, after demographic and family context variables had been entered. However, the absolute increment in prediction by neighborhood context was quite small across all child outcome variables. This would suggest that neighborhood, as a distal factor, accounted for a small but unique portion of the variance in young children's externalizing problems.

Second, parent education significantly predicted teacher-report social competence and cognitive concentration and reading achievement scores after the specific demographic variables had been entered. Parent occupation significantly predicted parent-report externalizing and internalizing. Race contributed to the prediction of all outcome measures after the specific demographic variables had been entered. The SES–race domain remained significant as a predictor category at the last step when all other categories had been entered, for parent-report externalizing and internalizing, teacher-report cognitive concentration, and

reading achievement. However, in response to our third question, the significance of race as a factor disappeared when all other variables were entered in the equations; except for reading achievement, whereas the SES variables remained as significant predictors for parent-report externalizing and internalizing, teacher-report cognitive concentration, and reading achievement. The specific demographic variables were not significant at the last step of the analysis for any of the outcome measures; however, as a predictor category, they predicted significant unique variance in children's math achievement (Table 5).

The fourth question dealt with whether family psychosocial risk variables account for variance in children's symptomatology over and above commonly studied demographic risk variables. This category of variables added significantly to the prediction of all the outcome variables when the demographic factors and SES and race were already entered and remained significant when neighborhood was entered, suggesting that these measures had a unique relation to various measures of child adjustment at first grade.

Fifth, mothers' depression significantly predicted only parent-report externalizing and internalizing after the family psychosocial variables and the demographic variables were entered and continued to predict those outcomes significantly when neighborhood context had been entered in the model.

Site effects were assessed by three dummy-coded (four sites) variables entered in the last step of the regression. Significant site effects were indicated by a significant increment in the total R^2 at this step. Site accounted for significant variance in the last step of model only for teacher-report social competence—although none of the sites differed significantly from the others—and reading achievement, with the Washington state site showing higher reading scores than all of the other sites.

Finally, we examined the last-step significance of each individual measure by type of adjustment outcome as an index of the unique contribution of each contextual factor. Behavior problems were predicted by quite different variables depending on the source of information on behavior. Parent ratings of externalizing problems on the CBCL were predicted uniquely by parent occupation, life stress, maternal depression, and neighborhood risk. Mothers were the predominant source of information for these contextual variables (except for neighborhood risk), as well as for the outcome measure. On the other hand, teacher ratings of behavior problems, as assessed by the Authority Acceptance subscale, were predicted by family expressiveness and neighborhood risk. The two other teacher-report measures, cognitive concentration and social competence, were uniquely predicted by Family Life Stress and Family Expressiveness. The two standardized measures of achievement were predicted uniquely by entirely different factors. Parent Education and Race predicted reading achievement, whereas Life Stress and Family Expressiveness predicted math achievement.

The patterns of unique variance in child outcomes predicted by the major risk domains mirror the preceding findings for individual risk factors but provide more succinct conclusions about the kinds of contextual risk related to different types of child outcome. In general the overall set of family psychosocial risk factors made the strongest unique predictions across all of the child outcomes. The one exception was the child's reading achievement, in which SES made the strongest contribution. SES and race predicted unique variance in parent-report outcomes, teacher-report cognitive concentration, and reading achievement, accounting for 1% to 6% of unique variance. Maternal depression uniquely predicted variance in mothers' ratings of children's behavior problems, and neighborhood risk uniquely predicted parent- and teacher-report behavior problems.

The goal of this article was to examine how risk domains in kindergarten predicted children's adjustment at the end of first grade. A separate, but related, question is how change in children's

status between kindergarten and the end of first grade can be predicted by the domains of risk. To explore this question, the main analyses were conducted again, controlling for the Time 1 outcomes by entering the relevant variable in the first step of the regression. These analyses were not possible for teacher report of cognitive concentration or social competence, as they were not assessed in kindergarten. The pattern of results of these analyses was largely the same as that presented in the Results section with the following exceptions. First, the models accounted for a larger proportion of variance in the Time 2 outcomes, with the same variable at Time 1 accounting for an additional 30% to 50% of the variance in Time 2 outcomes, indicating that there was a relatively high degree of stability over one year. Second, there were several differences in the variables that were significant at entry into the equation but few differences in the variables that remained significant at the last step. Specifically, the pattern of significance and magnitudes of standardized regression coefficients for CBCL Externalizing and Internalizing and WJ-R Letter-Word Recognition were the same. For Authority Acceptance, only neighborhood quality remained significant at the last step. For WJ-R Calculations, the number of siblings and race become significant in the last step, whereas life stress became nonsignificant. Taken together, these findings suggest that the relative impact of specific and broad demographic variables, family context variables, maternal depression, and neighborhood context were largely equivalent whether the analyses were predicting level of Time 2 outcomes or change in outcomes from Time 1 to Time 2.

To test whether the relation between the risk factors and outcomes differed for boys and girls, exploratory interactions of each risk factor with gender were tested using multiple regression. The order of entry of predictor variables was (a) the single order terms of all of the risk factors, (b) children's gender (coded as boys = -1, girls = 1, as recommended by Aiken & West, 1991), and (c) the interaction terms of each risk variable by gender. If there were significant interactions, a second multiple regression was tested eliminating all nonsignificant interactions from Step 3 in order to determine whether the interactions remained significant (i.e., were spurious as a result of numerous variables in the model). If an interaction remained significant, it was interpreted and the simple slopes of the interaction were probed using the technique suggested by West, Aiken, and Krull (1996). The models were retested twice. First, gender was recoded as boys = 0, girls = 1. The regression coefficients that resulted from this regression reflected the relation of each risk factor with the outcomes for boys. Second, gender was recoded as girls = 0, boys = 1, with the resulting regression coefficients reflecting the relation of each risk factor with the outcomes for girls.

There was a unique main effect of gender (coded boys = -1, girls = 1) only for teacher-report Authority Acceptance ($B = -.41, p < .01$), with behavior problems being higher for boys than for girls. There were few significant Gender $\times$ Risk Factor interactions. The interaction of Neighborhood Risk $\times$ Gender was significant for parent-report CBCL Externalizing (boys: $\beta = 3.35, p < .01$; girls: $\beta = -0.80, ns$) and teacher-rated Authority Acceptance (boys: $\beta = 0.43, p < .01$; girls: $\beta = 0.03, ns$). In both cases, the relation between neighborhood risk and the outcomes was stronger for boys than for girls.

In addition, the overall model was tested separately for boys and girls to assess whether the risk factors accounted for a different proportion of variance between boys' and girls' outcomes. The model R^2 s for each outcome tested separately for boys and girls are presented in Table 6. A greater proportion of variance was predicted for boys than for girls in parent-rated externalizing and internalizing problems and teacher-rated behavior problems, whereas a greater proportion of variance was predicted for girls than for boys in teacher-rated cognitive concentration. The gender difference between R^2 s for Social Competence, WJ-R Letter-Word Recognition, and WJ-R Calculations were nonsignificant.

It was recognized that one explanation for differences in variance accounted for boys and girls was that there might have been less variance for girls in some of the outcome variables. Thus, tests for mean differences and homogeneity of variance were conducted for each outcome variable. Although there were significant mean differences on all the outcome variables (except achievement scores), with boys demonstrating higher levels of problems, there was a significant difference in the variance for boys and girls only for teacher-rated Authority Acceptance. Thus, the difference in variance did not account for differences in the relations between the risk factors and outcomes for boys and girls.

Path Analyses

To further explore the direct and mediated effects of the broad demographic and neighborhood environment variables, nested path models were tested using PROC CALIS in SAS. In each set, a path model was specified that included the direct effects of education, occupation, and neighborhood risk but specified no relations (i.e., paths were set to zero) among these predictors and mediators or mediators and outcomes. This model was compared with the equivalent model, with the mediating effects estimated (i.e., paths from the predictors to the mediators and from the mediators to the outcomes freed to be estimated). Each set of models tested the mediating effects of one of three sets of mediators: specific demographics, family context, or maternal depression. The effects of the full models were compared with the direct-effects only models that examined the roles of education, occupation, and neighborhood risk. Using the criteria recommended by Baron and Kenny (1986) for investigating mediation, variables were retained in the model if they met the following criteria: Predictors were significantly related to both the mediators and outcomes, and mediators were significantly related to the outcomes. A subset of the study outcome variables was selected a priori on the basis of theoretical interest and to limit the number of tests conducted. Thus, parent-report externalizing problems, teacher-report Authority Acceptance and Social Competence, and the WJ-R Letter-Word Reading Achievement scale were used.

Specific demographic mediators—In the direct-effects model, education risk (higher score = lower education) was significantly related to lower teacher-report Social Competence ($\beta = .13, z = 2.05, p < .05$) and reading achievement ($\beta = -.28, z = 4.60, p < .001$). Neighborhood risk was related to higher levels of parent-report externalizing ($\beta = .16, z = 2.82, p < .01$) and teacher-report Authority Acceptance ($\beta = .29, z = 5.16, p < .001$), lower levels of teacher-report Social Competence ($\beta = .24, z = 4.32, p < .001$), and reading achievement ($\beta = -.23, z = 4.33, p < .001$). As occupation risk was not significantly related to any of the outcome variables, it was dropped from subsequent models. The direct-effects-only model demonstrated a poor fit to the data, $\chi^2(29, N = 332) = 242.93, p < .001$, Bentler's Comparative Fit Index (CFI) = .76.

In the mediation model, the direct effects of education and neighborhood risk, as well as their indirect effects through single-parent status, number of children in the family, and mother's age at target child's birth on outcomes were tested. Neighborhood risk significantly predicted single-parent status ($\beta = .37, z = 6.53, p < .001$), and single-parent status predicted both teacher-report Authority Acceptance ($\beta = .11, z = 2.07, p < .05$) and lower reading achievement ($\beta = -.19, z = 3.68, p < .001$). Neither number of children in the family nor mother's age at target child's birth was significantly related to the outcome variables. The mediational model demonstrated an adequate fit, $\chi^2(8, N = 332) = 59.93, p < .001$, CFI = .94. In addition, the chi-square difference was significant, indicating that the estimation of the mediating paths significantly improved the fit of the model, χ^2 difference (21) = 183.00, $p < .001$. The direct effects of education and neighborhood risk on the outcome variables remained largely the same in this model as compared with the direct-effects-only model. The magnitude of the paths was similar with all effects within .02 of those in the direct-effects-only model, with the exception of the path from neighborhood risk to reading achievement, which decreased in magnitude

from $-.23$ (direct effects) to $-.14$ ($z = 2.48, p < .05$) in the mediated model. Thus, the effect of neighborhood risk on reading achievement was partially mediated through the effect of single-parent status.

Family context mediators—Once again, the direct-effects-only model demonstrated a poor fit to the data, $\chi^2(50, N = 332) = 332.49, p < .001$, CFI = .71. In the mediational model, the direct effects of education and neighborhood risk, as well as their indirect effects through life stress, family expressiveness, social support, home environment, and marital distress on outcomes were tested. The mediational model demonstrated an adequate fit, $\chi^2(15, N = 332) = 85.80, p < .001$, CFI = .93. In addition, the chi-square difference was significant, indicating that the estimation of the mediating paths significantly improved the fit of the model, χ^2 difference(35) = 246.69, $p < .001$. The mediators of social support ($\beta = .24, z = 4.15, p < .001$) and home environment ($\beta = .51, z = 10.83, p < .001$) were significantly predicted by neighborhood risk.

Parent-report externalizing was related significantly to social support ($\beta = .10, z = 2.04, p < .05$) and neighborhood risk ($\beta = .14, z = 2.20, p < .05$). However, the effect of neighborhood risk on parent-report externalizing was not notably reduced in this model when compared with the effect in the direct-effects-only model. Teacher-report Authority Acceptance was predicted by home environment ($\beta = .15, z = 2.46, p < .01$) and neighborhood risk ($\beta = .19, z = 2.87, p < .01$). The effect of neighborhood risk, although remaining significant, decreased .10 in magnitude when compared with the effect in the direct-effects-only model, suggesting that the effect of neighborhood was partially mediated through home environment. Teacher-report Social Competence was significantly related to home environment ($\beta = .17, z = 2.70, p < .01$), education risk ($\beta = .14, z = 2.22, p < .05$), and neighborhood risk ($\beta = .15, z = 2.28, p < .05$). The direct effect of education risk remained essentially unchanged when compared with the effect in the direct-effects-only model, whereas the effect of neighborhood risk, although remaining significant, decreased .09 in magnitude, suggesting that the effect of neighborhood risk on social competence was partially mediated through home environment.

Reading achievement was significantly related to home environment ($\beta = -.13, z = 2.20, p < .05$), education risk ($\beta = -.30, z = 4.88, p < .001$), and neighborhood risk ($\beta = -.15, z = 2.34, p < .01$). The direct effect of education risk remained essentially unchanged when compared with the effect in the direct-effects-only model, whereas the effect of neighborhood risk, although remaining significant, decreased .08 in magnitude, suggesting that the effect of neighborhood risk on reading achievement was partially mediated through home environment.

Maternal depression as a mediator—The direct-effects-only model demonstrated a moderate fit to the data, $\chi^2(12, N = 332) = 132.01, p < .001$, CFI = .85, whereas the mediational model, including maternal depression, demonstrated an adequate fit, $\chi^2(5, N = 332) = 41.59, p < .001$, CFI = .95. The chi-square difference was significant, indicating that the estimation of the mediating paths significantly improved the fit of the model, χ^2 difference (7) = 90.42, $p < .001$. Maternal depression was significantly predicted by both education risk ($\beta = .16, z = 2.58, p < .01$) and neighborhood risk ($\beta = .27, z = 4.93, p < .001$), and maternal depression was significantly related to higher levels of parent-report externalizing ($\beta = .29, z = 5.43, p < .001$), teacher-report problems with social competence ($\beta = .11, z = 2.11, p < .05$), and lower reading achievement ($\beta = -.13, z = 2.59, p < .01$). Although the effect of education on social competence became nonsignificant, the direct effects of education remained largely the same, with magnitudes of effects within .02 of those in the direct-effects model. The direct effects of neighborhood risk on the outcome variables remained largely the same in this model as compared with those in the direct-effects model, with one exception. The effect of neighborhood risk on parent-report externalizing was reduced from .16 to .08 in magnitude.

and became nonsignificant, suggesting that the effect of neighborhood risk on parent-report externalizing was mediated through maternal depression.

Discussion

The purpose of this study was to examine the effects of demographic and psychosocial variables in predicting child behavior and achievement in the first grade of formal schooling. The advantage of studying these effects at first grade is that we obtained an estimate of the impact of early contextual influences on achievement and social, adaptation, in contrast to the majority of studies that have assessed the role of environment on functioning in middle childhood and adolescence (Aber, 1994; Dornbusch, Ritter, & Steinberg, 1991; Gonzales, Cauce, Friedman, & Mason, 1996; Sampson & Groves, 1989; Wyman et al., 1991). It is important to consider that the age of the child at which contextual effects are assessed may alter the pattern of contextual influences. The findings generally indicate that at each level of analysis, from specific demographic characteristics, to SES and race, to family psychosocial risk and atmosphere, to maternal depression, to the quality of the neighborhood, significant additional variance is accounted for in most outcomes. Overall, the dimensions of context assessed in this study predicted about 18% to 29% of the variance in child functioning at first grade. The unique variance accounted for by each of the major categories, when totaled across each account, ranged from 6% to 15%, or about one third to one half of the total variance accounted for by the measures. This suggests that the majority of variation in child outcomes was predicted by factors common to the combined set of predictors. Note that there is some potential monomethod bias: Although family psychosocial risks predicted nearly all outcomes, mother's report of depressive symptoms uniquely predicted only mother-rated child behavior problems.

If we return to the questions posed in the introduction, we see, first of all, that perceived neighborhood context did add significantly to the prediction of both teacher- and parent-reported child externalizing problems and teacher-rated social competence, once demographic and family psychosocial factors were considered. Furthermore, path analyses indicated that the effects of neighborhood risk were only partially mediated by psychosocial (home environment and social support) or demographic variables (single-parent status). These findings corroborate other recent findings on the effects of neighborhood. Duncan et al. (1994) found that the proportion of poor families in one's neighborhood was significantly related to parent-reported externalizing problems, and Kupersmidt et al. (1995) found that neighborhood, measured by social address indicators, was related to child aggression and peer relations beyond the variance accounted for by family characteristics. In the present study, it should be noted that other unmeasured variables such as parenting style may further mediate the relationship between neighborhood and child outcomes.

Second, although the specific demographic variables predicted outcomes when entered first in the model, they only made a unique contribution to predicting mathematics achievement, once other variables were in the model. The active variables of single parenthood and a large number of siblings each suggest limited access to the intellectual resources of the family, a factor that Zajonc (1976) has argued as accounting for some of the relation between birth order and achievement.

Third, the domain of SES–race contributed uniquely to the prediction of five of the seven child outcomes and added significant incremental prediction to all outcomes, even when specific demographic factors were in the model. However, after all domains of risk were added, there was a significant unique effect of race only on reading achievement, and thus, race is not likely to be a unique causal factor in child behavioral outcome. This finding replicates those of Dodge et al. (1994) and Patterson et al. (1990) that effects of race on children's externalizing behavior appear to operate vis-à-vis SES, and it extends these findings to both internalizing behavior as

well as school achievement. Unfortunately, as the predictor variables were measured at the same time, it is not possible to adequately assess models of mediation. However, as race was moderately correlated with single-parent status, quality of the home environment, and neighborhood risk, but only mildly related to SES, it is likely that the quality and risks afforded by the home and neighborhood are likely to account for the association between race and outcome. It is also possible that family-level or individual-level processes not measured in this study may account for the relation between race and child outcomes. Inclusion of these influences would help clarify this relation (Bronfenbrenner, 1992; Slaughter-Defoe, 1995).

Although SES may be considered a marker of risks that can be further decomposed, parental education and occupation-income may directly afford advantages that lead to better academic readiness. The findings indicated that education level provided unique variance in predicting teacher-rated cognitive performance and social competence and the child's reading achievement; path analyses indicated that none of the other measured variables mediated the effect of education on these child outcomes. On the other hand, other factors associated with education that were not measured here (parenting style, genetic endowment, and intergenerational familial influences) might also contribute to child outcomes (Farrington, 1994). Occupation uniquely predicted parent-rated variables of externalizing and internalizing problems. Further analysis of the occupation variable (when entered last in the regression model) indicated that the differences that resulted from occupation were the result of significant contrasts between the lowest occupation classification (unemployed and homemaker) versus all of the other occupation categories; there were no significant contrasts between unskilled versus skilled or professional occupations. These findings on occupations may prove similar to those on income (which were not collected in this sample), in which poverty and persistent economic hardship are related to a broad range of child difficulties (Bolger et al., 1995; McLeod & Shanahan, 1993; McLoyd, 1990).

The psychosocial risk of the family environment added as much as 8% to 10% additional variance and made the strongest unique contributions to the teacher- and parent-reported behavioral outcomes. In almost all cases, independent of reporter, the amount of life stress experienced by the family in the current year contributed unique variance to the child's behavioral symptomatology as well as social competency. This finding is quite similar to that of Liaw and Brooks-Gunn (1994) as well as to the inner-city African American sample of Myers et al. (1992). The effects of life stress were unrelated to SES and other demographic variables and, although showing simple associations to marital distress and parent's history of problems, were independent of these variables. It is possible that the effects of negative life stress are mediated through nonmeasured factors such as quality of parenting or the child's affect and cognitions resulting from these life events. On the other hand, the fact that life stress most strongly predicts problems observed in the home may reflect a direct impact of these stressors on the behavior and functioning of the child in the home context, rather than in the school context. It was somewhat surprising that mothers' reports of marital quality were unrelated to child outcomes, even those reported by the mothers. It is possible that dichotomizing the scale in order to retain single-parent families may have resulted in diminished power to detect an effect.

Other family psychosocial predictors appeared to have different effects according to the source of outcome data. The mother's report of social support and depression uniquely predicted her ratings of both externalizing and internalizing symptomatology but were unrelated to teacher reports of child functioning. This may indicate a reporter effect; mothers who report being more isolated and less satisfied with their own relationships may be more likely to see their children as problematic. In contrast, the family's expressiveness regarding emotions and the quality of the home environment, although unrelated to parent reports of children's problems, predicted unique variance in teacher reports of all aspects of behavior, as well as math

achievement (for family expressiveness). The more communicative the family is regarding emotions, both of positive and negative valence, the better the child's functioning at school. There are a number of possible explanations for this finding. These include the fact that families who are more verbally expressive of affect are likely to have children that show better emotion regulation and thus better behavior and concentration in the school environment (Gottman & Fainsilber-Katz, 1996) and that the measure of family expressiveness may be assessing the more general quality of the nature of family communication, rather than emotional communication alone. To explore the issue of communication valence further, the subscores of expression of positive and negative affect were examined separately for their unique variance. In most equations, both scores contributed about equally to the outcomes of teacher ratings of behavior and math achievement, indicating no differential effect. The effects of the quality of the home environment are in accord with those of others (Dubow & Ippolito, 1994; Duncan et al, 1994; Elardo & Bradley, 1981), indicating that both the nature of the physical environment as well as the provision of materials, books, and space for child activity play a significant role in the child's well-being and have effects that cannot be accounted for by social class alone.

The exploratory analyses to examine gender as a possible moderator of the relations between risk factors and outcomes suggest that neighborhood context may influence the functioning of boys and girls differently. It appears that for both parent and teacher ratings of externalizing difficulties, gender significantly moderates the impact, with neighborhood effects being strongly significant for boys and absent for girls. The reasons for this are unclear. It may be that boys who are difficult, and troublesome are more affected by extrafamilial influences in the surrounding ecology, whereas girls are less likely to venture out and be exposed to other neighborhood influences at this young age. Alternatively, it may be that boys are more responsive to the negative influences of the neighborhood, such as older boys who get into trouble. This may be another example of the fact that boys appear to be more vulnerable to the effects of their environment (Bolger et al., 1995; Joffe et al., 1988; Simcha-Fagan et al., 1986; Vaden-Kiernan et al., 1995).

The findings also indicate that some risk factors impact boys and girls differently. The exploratory analyses of the amount of variance accounted for showed a number of significant differences by sex. Approximately twice as much variance was predicted in parent-reported outcomes for boys as for girls. Although there were fewer differences in teacher-reported outcomes by gender, more variance was predicted for boys than for girls in teacher reports of behavior problems. This may indicate a reporter bias that led to greater links between family conditions and the outcome of boys, as reported by their mothers. On the other hand, such a finding might indicate that other risk factors, not currently measured in risk factor research, might improve the ability to account for outcomes in girls (Shaw et al., 1994).

The results of the present study indicate that ecobehavioral risk factors assessed during kindergarten are substantially associated with adaptation in first grade. Although strongest predictive factors seem to operate as the shared influence of many related contextual factors, family psychosocial context, SES, and neighborhood quality predicted unique variance in children's academic and social functioning. These factors predicted both positive and negative early child outcomes. We expect that the longitudinal study of carefully selected community samples will be critical in elucidating the long-term risk factors important for identifying at-risk children and for developing more effective preventive interventions.

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Table 1

Intercorrelations Among the Risk Indexes

Risk index	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Single parent	—												
2. No. of siblings	-.05**	—											
3. Mother's age at TC's birth	-.21**	-.01	—										
4. Education risk	.13**	.13**	-.40**	—									
5. Occupation risk	.14**	.18**	-.35**	.59**	—								
6. Race	.49**	.15**	-.12*	.09	.17**	—							
7. Life stress	.04	.06	.02	-.03	-.02	-.08	—						
8. Verbal expressiveness	.03	.05	-.00	.10	.09	-.08	.01	—					
9. Marital distress	-.27**	.03	.01	.01	.05	-.17**	.15**	.10*	—				
10. Social support	.06	.09	.04	-.01	.03	.03	.12*	.17**	.09	—			
11. Home environment	.31**	.17**	-.22**	.29**	.35**	.32**	.05	.00	-.05	.13**	—		
12. Parent depression	.24**	.10	-.20**	.26**	.22**	.10	.14**	.13**	.13**	.28**	.32**	—	
13. Neighborhood risk	.35**	.22**	-.24**	.32**	.40**	.38**	.02	.02	-.01	.18**	.58**	.31**	—

Note. TC = target child.

* $p \leq .05$.

** $p \leq .01$.

Table 2

Intercorrelations Among the Child Outcomes

Child outcome	1	2	3	4	5	6	7
Parent report							
1. CBCL Externalizing	—						
2. CBCL Internalizing	.67***	—					
Teacher report							
3. Authority acceptance	.33***	.19***	—				
4. Social competence	.28***	.18***	.79***	—			
5. Cognitive concentration	.31***	.22***	.60***	.74***	—		
Achievement							
6. WJ-R Letter-Word Recognition	-.18***	-.17***	-.27***	-.34***	-.49***	—	
7. WJ-R Calculations	-.02	-.08	-.17***	-.24***	-.32***	.53***	—

Note. CBCL = Child Behavior Checklist; WJ-R = Woodcock-Johnson Psycho-Educational Battery—Revised.

$p \leq .001$.

Total R² and Standardized Regression Coefficients for Variables at Each Step and the Final Step of the Hierarchical Regressions Predicting Parent Report of Children's Symptoms

Table 3

Step/risk factor	CBCL Externalizing				CBCL Internalizing					
	r^a	Entry	Total R^2	Last step	Unique	r^a	Entry	Total R^2	Last step	Unique
1. Specific demographics			.05*		.01			.03*		.00
No. of siblings	.07	.11*				.06	.06			
Mother's age at TC's birth	-.15**	-.12*				-.16**	-.16**			
Single parent	.13	.12				.05	.01			
2. SES-race			.09*		.01*			.10*		.02*
Education	.15**	.02				.17**	.04			
Occupation	.19***	.16*		.12*		.21***	.19**		.16**	
Race	-.06	-.19				-.12*	-.22***			
3. Family risk			.18*		.07*			.17*		.06*
Life stress	.27***	.25***		.24***		.22***	.20***		.19***	
Family expressiveness	-.12*	-.06				-.15**	-.01			
Social support	.14*	.11*				.16	.10*			
Marital distress	-.00	-.08				.09	.01			
Home environment	.15**	.02				.07	-.03			
4. Mother's depression	.33***	.28***	.23*	.25***	.04*	.36***	.30***	.24*	.30***	.06*
5. Neighborhood risk	.23***	.17**	.25*	.17**	.02*	.16	.12	.24		.01
6. Site			.26		.01			.25		.01
Durham		-.02					-.09			
Nashville		.08					-.02			
Pennsylvania		.08					.03			

Note. Values in the Entry and Last step columns are standardized regression coefficients. Only significant values have been printed for Last step. Values in the Total R² column reflect the cumulative proportion of variance accounted for by the model at each step. Values in the Last step column are effects of risk factors that remain significant when controlling for all other risk factors. Values in the Unique column reflect the proportion of unique variance accounted for by the major risk categories when the other categories are controlled in the model. TC = target child; SES = socioeconomic status.

^a *r* = simple correlation.

For regression coefficients,

* *p* ≤ .05.

** *p* ≤ .01.

*** *p* ≤ .001.

For R²,

* *p* ≤ .05 (no further distinctions made).

Table 4
Total R² and Standardized Regression Coefficients for Variables at Each Step and the Final Step of the Hierarchical Regressions Predicting Teacher Report of Children's Symptoms

Step/risk factor	Authority acceptance				Social competence				Cognitive concentration						
	<i>r</i> ^a	Entry	Total <i>R</i> ²	Last step	Unique	<i>r</i> ^a	Entry	Total <i>R</i> ²	Last step	Unique	<i>r</i> ^a	Entry	Total <i>R</i> ²	Last step	Unique
1. Specific demographics															
No. of siblings	.06	.11 *	.07 *		.00	.10 *	.14 **	.07 *		.00	.09	.12 *	.08 *		.00
Mother's age at TC's birth	-.16 **	-.08 ***				-.10 ***	-.06 ***				-.15 **	-.13 *			
Single parent	.05	.22 ***				.20 ***	.21 ***				.18 ***	.19 ***			
2. SES-race			.11 *		.00			.14 *		.01			.14 *		.02 *
Education	.17 ***	.06				.21 ***	.17 **				.23 ***	.16 **		.14 *	
Occupation	.21 ***	.07				.22 ***	.08 ***				.22 ***	.08			
Race	-.12 *	.18 **				.27 ***	.20 ***				.24 ***	.19 **			
3. Family risk			.18 *		.03 *			.20 *		.03 *			.20 *		.04 *
Life stress	.22 ***	.14 **		.11 *		.12 *	.14 **				.15 **	.15 **		.12 *	
Family expressiveness	.11 *	.13 **		-.13 **		.09	.12 *				.06	.12 *		.12 *	
Social support	.11 *	.08				.06	.01				.10 *	.07		-.12 *	
Marital distress	-.02	.02				.01	.01				.05	.06			
Home environment	.30 ***	.17 **				.30 ***	.18 **				.28 ***	.13 *			
4. Mother's depression	.19 ***	.07	.18		.00	.20 ***	.07	.20		.00	.22 ***	.07	.21		.00
5. Neighborhood risk	.31 ***	.18 **	.20 *	.17 **	.02 *	.29 ***	.13 *	.21 *		.01	.24 ***	.04	.21		.00
6. Site			.21		.01			.24 *		.03 *			.22		.01
Durham		.08					.07					.06			
Nashville		.12					.13					.00			
Pennsylvania		-.05					-.10					-.14			

Note. Values in the Entry and Last step columns are standardized regression coefficients. Only significant values have been printed for Last step. Values in the Total *R*² column reflect the cumulative proportion of variance accounted for by the model at each step. Values in the Last step column are effects of risk factors that remain significant when controlling for all other risk factors. Values in the Unique column reflect the proportion of unique variance accounted for by the major risk categories when the other categories are controlled in the model. TC = target child; SES = socioeconomic status.

a. *r* = simple correlation.

For regression coefficients,

* *p* ≤ .05.

** *p* ≤ .01.

*** *p* ≤ .001. For *R*²,

For *R*²,

* *p* ≤ .05 (no further distinctions made).

Total R² and Standardized Regression Coefficients for Variables at Each Step and the Final Step of the Hierarchical Regressions Predicting Children's Achievement Test Scores

Table 5

Step/risk factor	WJ-R Letter—Word Recognition				WJ-R Calculations					
	<i>r</i> ^a	Entry	Total <i>R</i> ²	Last step	Unique	<i>r</i> ^a	Entry	Total <i>R</i> ²	Last step	Unique
1. Specific demographics										
No. of siblings	-.16**	-.19***	.14*		.01	-.21***	-.23***	.12*		.02*
Mother's age at TC's birth	.20***	.15***				.13***	.08***			
Single parent	-.27***	-.26***				-.24***	-.25***			
2. SES—race			.24*		.06*			.15*		.01
Education	-.36***	-.31***		-.28***		-.16***	-.07			
Occupation	-.27***	-.04				-.17***	-.05			
Race	-.27***	-.16		-.15*		-.27***	-.14*			
3. Family risk			.26*		.01			.17*		.02*
Life stress	-.01	-.01				-.00	-.01		.10*	
Family expressiveness	.01	-.04				.10	.11*			-.11*
Social support	-.10	-.05				-.05	.02			
Marital distress	-.02	-.06				.05	.02			
Home environment	-.30***	-.13*				-.23***	-.13*			
4. Mother's depression	-.27***	-.08	.27		.00	-.15***	-.03	.17		.00
5. Neighborhood risk	-.27***	-.04	.27		.00	-.19***	-.09	.18		.01
6. Site	-.31		.29*		.02*			.18		.00
Durham		-.17**					.00			
Nashville		-.19**					-.07			
Pennsylvania		-.18					.03			

Note. Values in the Entry and Last step columns are standardized regression coefficients. Only significant values have been printed for Last step. Values in the Total R² column reflect the cumulative proportion of variance accounted for by the model at each step. Values in the Last step column are effects of risk factors that remain significant when controlling for all other risk factors. Values in the Unique column reflect the proportion of unique variance accounted for by the major risk categories when the other categories are controlled in the model. WJ-R = Woodcock-Johnson Psycho-Educational Battery—Revised; TC = target child; SES = socioeconomic status.

a. *r* = simple correlation.

For regression coefficients,

* $p \leq .05$.

** $p \leq .01$.

*** $p \leq .001$.

For R²,

* $p \leq .05$ (no further distinctions made).

Overall R² of the Model (Including All Risk Factors) Tested Separately for Boys and Girls and z Test for the Difference Between Independent R²s

Table 6

Outcome	Boys			Girls			Difference between R ² s		
	R ²	F	P<	R ²	F	P<	R ² difference	z	P<
Parent report									
Externalizing	.38	6.01	.001	.17	1.84	.05	.22	6.24	.001
Internalizing	.32	4.59	.001	.20	2.33	.01	.12	3.48	.001
Teacher report									
Authority acceptance	.29	3.98	.001	.21	2.48	.01	.08	2.24	.05
Social competence	.28	3.77	.001	.33	4.49	.001	-.05	1.30	ns
Cognitive concentration	.22	2.73	.001	.30	3.96	.001	-.08	2.26	.05
Achievement									
WJ-R Letter-Word Recognition	.29	3.76	.001	.34	4.66	.001	-.05	1.41	ns
WJ-R Calculations	.17	1.99	.02	.23	2.76	.001	-.06	1.63	ns

Note. WJ-R = Woodcock-Johnson Psycho-Educational Battery—Revised.