

## Can Instructional and Emotional Support in the First-Grade Classroom Make a Difference for Children at Risk of School Failure?

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This study examined ways in which children's risk of school failure may be moderated by support from teachers. Participants were 910 children in a national prospective study. Children were identified as at risk at ages 5–6 years on the basis of demographic characteristics and the display of multiple functional (behavioral, attention, academic, social) problems reported by their kindergarten teachers. By the end of first grade, at-risk students placed in first-grade classrooms offering strong instructional and emotional support had achievement scores and student–teacher relationships commensurate with their low-risk peers; at-risk students placed in less supportive classrooms had lower achievement and more conflict with teachers. These findings have implications for understanding the role that classroom experience may play in pathways to positive adaptation.

Identifying the conditions under which experiences in school settings can alter the early trajectories of children's social or academic functioning has important implications for understanding pathways to children's positive adaptation. Of particular interest is whether experiences in high-quality classrooms can help close the gap between children at risk of school failure and their low-risk peers, particularly in the early grades when small increments in achievement play a large role in eventual outcomes (Alexander, Entwisle, & Kabbani, 2001; Ferguson, 1998; Phillips, Crouse, & Ralph, 1998; Ross, Smith, Slavin, & Madden, 1997). Two bodies of work are relevant to this question. The first examines everyday classroom interactions between teachers and children that predict more positive development for all children (Brophy & Good, 1986; Gage & Needel, 1989; Howes et al., 2005; NICHD ECCRN, 2003; Pianta, LaParo, Payne, Cox, & Bradley, 2002; Rimm-Kaufman, LaParo, Pianta, & Downer, in press; Ritchie & Howes, 2003; Skinner & Belmont, 1993; Stipek et al., 1998). The second area of research provides evidence of specific school-based interventions that may alter trajectories for students with various risk factors (Battistich, Schaps, Watson, & Solomon, 1996;

Durlak & Wells, 1997; Elias, Gara, Schuyler, Branden-Muller, & Sayette, 1991; Greenberg et al., 2003; Weissberg & Greenberg, 1998; Wilson, Gottfredson, & Najaka, 2001). At the intersection of these areas of education and developmental science is the question of whether students' everyday instructional and social interactions with teachers in the classroom may themselves ameliorate the risk of school failure. If this were the case, focused efforts related to teacher training and support, curriculum implementation, and assessments of classroom settings could be used more strategically to counter the tendency toward poor outcomes for such children (see Pianta, in press for a discussion). The current study used data from a large, national prospective study of children and families to examine ways in which risk of school failure may be moderated by strong support from teachers in the first-grade classroom. Specifically, we examined whether children at risk of early school failure experiencing high levels of instructional and emotional support in the first grade displayed higher achievement and lower levels of student–teacher conflict than did their at-risk peers who did not receive this support.

### *Everyday Classroom Interactions and Student Outcomes*

Research on everyday classroom processes that may alter trajectories for students at risk has its foundations in the process–product research from the 1960s to 1980s that focused attention on observable teacher behaviors (Brophy & Good, 1986; Gage & Needel, 1989) and in developmentally informed

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theories of schooling that focus attention on socio-emotional, motivational (Connell & Wellborn, 1991; Deci & Ryan, 1985; Eccles, 1993; Wentzel, 2002) and instructional (e.g., Resnick, 1994; Stevenson & Lee, 1990) experiences in classrooms that trigger growth and change in competence. Although it posited the type of interactions between student characteristics and teacher behaviors that are now beginning to be reported in the literature (e.g., Morrison & Connor, 2002; Rimm-Kaufman et al., 2002) and has resulted in frameworks for describing classroom processes that inform educational research (e.g., Brophy, 2004), the process-product research tradition did not yield a body of empirical findings that provide a strong case for classroom effects, particularly in relation to issues such as moderation of child characteristics. Reviews of the contribution of this literature in large part note the lack of grounding in developmental and psychological research as well as the complex and interactive nature of student's classroom experiences (Gage & Needel, 1989; Good & Weinstein, 1986). Within developmental psychology, the focus on proximal processes in ecological models (Bronfenbrenner & Morris, 1998; Lerner, 1998; Sameroff, 1995, 2000) and the extension of these perspectives to school settings (Connell & Wellborn, 1991; Pianta, 1999; Resnick, 1994; Stevenson & Lee, 1990) have advanced efforts to understand the interactive processes through which children and adolescents experience the classroom environment (Pianta, in press). Roeser, Eccles, and Sameroff (2000) extend the linkage between developmental studies and education even further when arguing, with respect to understanding middle school effects, for research "linking the study of adolescents' experience, motivation, and behavior in school with the study of their teachers' experience, motivation, and behavior at school" (p. 466). This explicit need to focus on the interaction of child characteristics with types or categories of resources available in classroom (and school) settings is consistent with Rutter and Maughan's (2002) analysis of shortcomings in the school-effects literature. However, if such an approach is to yield more fruitful results than the process-product work, it is in large part predicated on more sophisticated understandings of the developmental needs of children vis-à-vis experiences in school (e.g., Reid, Patterson, & Snyder, 2002) and parallel efforts to understand and measure developmentally relevant assets in school environments (see Morrison & Connor, 2002; Rimm Kaufman et al., 2002 as recent examples).

One avenue for advancing the understanding of schooling as a moderator of child (or background)

characteristics is the assessment of variation in the nature, quality, and quantity of teachers' interactions with students (e.g., Burchinal et al., 2005). Recent large-scale observational studies indicate that these types of interaction within classrooms are highly variable (e.g., National Institute of Child Health and Human Development, Early Child Care Research Network (NICHD ECCRN), 2002b, in press). Even the most well-described, manualized, standardized, scientifically based classroom intervention programs are enacted in practice in ways that vary widely from child to child or classroom to classroom (e.g., Greenberg, Doitrovich, & Bumbarger, 2001). In descriptions of less-tightly prescribed classroom interactions, the degree to which classroom teachers make productive use of time or classrooms are well-managed ranges across the full spectrum of possibilities, even though kindergartens and first-grade classes appear, on average, to be positive and supportive social settings (NICHD ECCRN, 2002b, in press; Pianta et al., 2002).

In recent large-scale observational studies of pre-k to elementary classrooms, two dimensions consistently emerge: instructional support and emotional support (NICHD ECCRN, 2002b, in press; Pianta et al., 2002; Pianta, La Paro, & Hamre, 2005). Interestingly, these two dimensions, to some extent, predict differentially children's social and academic outcomes, confirming theoretical views that various developmental needs of children may interact differentially with the qualities of school settings (Connell & Wellborn, 1991; Morrison & Connor, 2002; Rutter & Maughan, 2002). For example, when evaluated in the same prediction model, instructional support for learning predicts achievement outcomes to a significantly greater degree than emotional support predicts these same outcomes (Howes et al., 2005). On the other hand, children's anxious behavior reported by mothers (but not academic performance) is predicted by the degree of classroom structure and instructional press in the first grade (NICHD ECCRN, 2003), while higher levels of emotional support predict a very broad range of social and task-oriented competencies such as following directions (Howes et al., 2005). Morrison and Connor (2002) argue that the effects of schooling on development have to be modeled at the level of specific forms of input and resource that are matched to specific child needs, abilities, and skills. Thus, according to Morrison and Connor (2002), it is not only necessary to conceptualize and measure the classroom setting (or school) in terms of specific aspects of the instructional or social environment, but also to gauge the effects of those experiences relative

to how well they match the child's capacities and skill. In this view, school effects are predominantly in the form of interactions between specific inputs from the classroom and the characteristics of the child.

These two broad dimensions of everyday teacher–student classroom interactions—emotional and instructional support—with theoretical and empirical links to student development, can be a starting point for examining interactions with child and background characteristics, particularly attributes that place children at risk for school failure. In global observations reported in the literature, emotional support encompasses the classroom warmth, negativity, child-centeredness as well as teachers' sensitivity and responsiveness toward specific children (NICHD ECCRN, 2002b, *in press*). This should not be surprising as a number of developmentally informed theories suggests that positive and responsive interactions with adults (parents, teachers, child-care providers) contribute to regulation of emotional experience and social behavior, the development of skills in social interactions, and emotional understanding (Birch & Ladd, 1998; Connell & Wellborn, 1991; Eccles, 1993; Howes, 2000; Howes, Matheson, & Hamilton, 1994; Pianta, 1999; Wentzel, 2002). Confirming this perspective are results indicating that exposure to positive classroom climates and sensitive teachers is linked to greater self-regulation among elementary and middle school students (Skinner, Zimmer-Gembeck, & Connell, 1998), greater teacher-rated social competence (Burchinal et al., 2005; Howes, 2000; Pianta et al., 2002), and decreases in mother-reported internalizing problems from 54 months to the end of the first grade (NICHD ECCRN, 2003).

From a somewhat different theoretical perspective, teachers' emotional support directly provides students with experiences that foster motivational and learning-related processes important to academic functioning (Crosnoe, Johnson, & Elder, 2004; Greenberg et al., 2003; Gregory & Weinstein, 2004; Pianta et al., 2002; Rimm-Kaufman et al., *in press*; Roeser et al., 2000; Zins, Bloodworth, Weissberg, & Walberg, 2004). Theories of motivation suggest that students who experience sensitive, responsive, and positive interactions with teachers perceive them as more supportive and are more motivated within the academic contexts of schooling (Connell & Wellborn, 1991; Deci & Ryan, 1985; Eccles, 1993). In the early grades, Pianta et al. (2002) found that when teachers offered a more child-centered climate, kindergarten children were observed to be more often on-task and engaged in learning. Among older students, perceptions of positive relatedness to teachers predict

gains in student engagement over the course of the school year (Furrer & Skinner, 2003), increased motivation to learn (Roeser et al., 2000) and greater academic achievement (Crosnoe et al., 2004; Gregory & Weinstein, 2004). Consistent with this link between motivation and support from adults, teacher support was related to sixth graders' school and class-related interests and pursuit of social goals (Wentzel, 2002), which in turn predicted pursuit of social goals and grades in the seventh grade. For children at risk of problems in school, Noam and Herman's (2002) school-based prevention approach emphasizes the primary importance of relationships with a school-based mentor (Noam, Warner, & Van Dyken, 2001), based explicitly on the rationale that such relationships function as resources and resilience mechanisms in counteracting the effects of risk mechanisms attributable to problems in family relationships.

Notwithstanding the importance of relationships and social support, the nature and quality of instruction is of paramount importance for the value of classroom experience that is intended to produce gains in learning; in elementary school, instruction is under great scrutiny as a result of standards and performance evaluations (Pianta, *in press*). Although the apparent dichotomy between child-centered and direct instruction has for some years dominated discussions of learning in the early grades (see Stipek et al., 1998), there is accumulating evidence that teachers' instructional interactions with children have the greatest value for students' performance when they are focused, direct, intentional, and characterized by feedback loops involving student performance (Dolezal, Welsh, Pressley, & Vincent, 2003; Juel, 1996; Meyer, Wardrop, Hastings, & Linn, 1993; Pianta et al., 2002; Torgesen, 2002). Torgesen (2002) provides an explicit example of this type of instruction applied to the area of reading by suggesting three primary ways in which everyday teaching can contribute to growth in reading skills: the provision of explicit teaching experiences and practice (i.e., phonemic skills, vocabulary); more productive classroom time in which there are more opportunities for teaching and learning; and intensive scaffolding and feedback to students about their progress. The value of intentional, focused interaction and feedback is not limited to reading, but appears to be a key component in other skill domains such as writing (Matsumura, Patthey-Chavez, Valdes, & Garnier, 2002) that may extend to cognition and higher order thinking (Dolezal et al., 2003).

In addition, these instructional inputs are also associated with more positive and fewer negative interactions between students and teachers, and

higher levels of attention and task-oriented behavior (NICHD ECCRN, 2002a; Pianta et al., 2002). Yet, as was the case for emotional support in classrooms, large-scale studies document great variation in the frequency and quality of these instructional procedures within early elementary school classrooms (Meyer et al., 1993, NICHD ECCRN, 2002a, in press). For example, within the NICHD Study of Early Child Care sample (NICHD ECCRN, 2002b, in press), teachers provided specific academic instruction in an average of 8% of all observed intervals over the course of a morning-long observation. However, the range was remarkable, with some classrooms providing no explicit instruction and others providing this instruction in almost 70% of observed intervals. This variability provides an opportunity to examine ways in which exposure to these classroom processes may impact student achievement.

Taken together, research on the nature and quality of early schooling experiences provides emerging evidence that classroom environments and teacher behaviors are associated in a “value-added” sense with student outcomes. Yet, until recently, few researchers have specifically examined the possibility that these everyday processes in elementary school classrooms may help close (or increase) the gap in student achievement observed among students at risk of school failure because of demographic characteristics (low income, minority status) or functional risks such as serious behavioral and emotional problems. Although there is increasing evidence from well-designed and highly controlled studies that school-based interventions that prescribe certain desired teacher–child interactions can succeed in ameliorating some risks (Catalano et al., 2003; Greenberg et al., 2001; Jalongo et al., 1999; Walker, Stiller, Severson, Feil, & Golly, 1998), there is little available evidence on whether features of classrooms and child–teacher interactions such as emotional or instruction support, present in everyday classroom interactions in naturally varying samples, are sufficiently potent to counteract risk for school failure.

#### *Everyday Interactions and Risk for Early School Failure*

Recent evidence from developmentally informed studies of naturally occurring variation in classroom environments directly test the hypothesis that everyday experiences within elementary classrooms may moderate outcomes for children at risk (Peisner-Feinberg et al., 2001). In one such study, Morrison and Connor (2002) demonstrate that children at risk of reading difficulties at the beginning of the first grade (identified on the basis of test scores) benefited

from high levels of teacher-directed explicit language instruction—the more teacher-directed, explicit instruction they received, the higher were their word-decoding skills at the end of the first grade. In contrast, teacher-directed explicit instruction made no difference in decoding skills for children with already high skills on this dimension upon school entry. These highly skilled children made the strongest gains in classrooms, with more child-led literacy-related activities.

In another study providing evidence of the moderating effect of teachers’ classroom behaviors on outcomes for at-risk children, Rimm-Kaufman et al. (2002) examined whether teacher sensitivity predicted kindergarten children’s behavior for groups of socially bold and wary children, with the bold children demonstrating high levels of off-task behavior and negative interactions with peers and teachers. Although there was no relation between teachers’ sensitivity and child classroom behavior among the socially wary children, socially bold children who had more sensitive teachers were more self-reliant and displayed fewer negative and off-task behaviors than did bold children with less sensitive teachers. Similarly, two recent studies suggest that student–teacher conflict is a stronger predictor of later problems for children who display significant acting out behaviors than for their peers who do not display these behavior problems (Hamre & Pianta, 2001; Ladd & Burgess, 2001). Taken together, these studies suggest that positive social and instructional experiences within the school setting may help reduce children’s risk, while negative interactions between teachers and children may be particularly problematic for those children displaying the highest risk of school failure. In the present study, we follow and extend the work of Morrison and Connor (2002) and Rimm-Kaufman et al. (2002) to examine effects of two dimensions of classroom process (instructional and emotional quality) on moderating the association(s) between two forms of risk for failure in achievement and social adjustment in the first grade.

#### *Defining School-Based Risk*

Although conceptualizations of risk vary, two central categories of children’s risk for early school failure relate to *demographic* and *functional* risks. Prior to entering school, it is largely family and demographic factors that place children at risk of failure. One of the most robust of these demographic risk indicators is low maternal education (e.g., Christian, Morrison, & Bryant, 1998; Ferguson, Jimerson, &

Dalton, 2001; NICHD ECCRN, 2002a; Peisner-Feinberg et al., 2001; Shonkoff & Phillips, 2000). One reason posited for this is that children of mothers with low levels of education are less likely to be exposed to frequent and rich language and literacy stimulation (Bowman, Donovan, & Burns, 2001; Christian et al., 1998; Hart & Risley, 1995; U.S. Department of Education, 2000) and thus may come to kindergarten with fewer academic skills (Pianta & McCoy, 1997). These early gaps are often maintained throughout children's school careers (Alexander et al., 2001; Entwisle & Hayduk, 1988; Ferguson et al., 2001).

In addition to demographic factors that signal risk, indicators reflecting children's general functioning and adaptation in the classroom as they enter school (behavioral, attention, social, and academic problems) are established predictors of success or failure in the next grade(s). Children identified by their teachers as displaying difficulties in these domains in the early school years are at higher risk of problems throughout their school careers (Alexander et al., 2001; Flanagan et al., 2003; Hamre & Pianta, 2001; Ladd, Buhs, & Troop, 2002; Lewis, Sugai, & Colvin, 1998). Although problems in individual domains of functioning predict future difficulties, research suggests that the accumulation of multiple risks is typically a much stronger indicator of later problems (Gutman, Sameroff, & Cole, 2003; Seifer, Sameroff, Baldwin, & Baldwin, 1992) and therefore our approach to conceptualizing and assessing functional risk will rely on multiple indicators.

### *Current Study*

The current study was designed to extend work related to school effects by following children identified in kindergarten as being at risk of school failure and examining whether the classroom environment to which they were exposed during the first grade moderated these risks by the end of the first grade. Rutter and Maughan (2002) suggest that effectively testing environmental influences on child development requires attending to several methodological issues. First, they suggest using longitudinal data to measure change within individuals. We were interested in assessing achievement and relational functioning in first grade as a function of the support these children received from teachers; therefore, we needed to adjust for previous performance on these outcomes. Ideally, we would adjust for performance at the beginning of the first-grade year; however, because multiple assessments were not available within the first-grade year, we adjusted for earlier

performance on the outcomes (completed at either 54 months or kindergarten). Secondly, Rutter and Maughan (2002) suggest using some form of *natural experiment* that "pulls apart variables that ordinarily go together" (p. 46). Within this study, the classroom process itself served as the natural experiment, in which children with differing risk backgrounds in kindergarten were placed in first-grade classrooms offering varying levels of emotional and instructional support. Their third recommendation suggests quantified measurement of the postulated causal factor; here we use observations of teachers' instructional and emotional support conducted within classrooms, a notable difference from most previous research on classroom effects, which relies on structural features of the classroom or teacher-reported practices. Two of Rutter and Maughan's (2002) last three recommendations, testing for a dose response gradient and controlling for social selection, initial level, and self-perpetuating effects were also attended to within this study. The last recommendation, explicitly testing the hypothesized mechanism against some competing explanations, was beyond the scope of this study, although the implications of not testing competing explanations are addressed in the discussion.

Because of an interest in examining both academic and social functioning, we examined two major outcomes—performance on an individually administered, standardized achievement battery, and first-grade teacher ratings of conflict with the student. Although student–teacher conflict could be viewed as a classroom process, when assessed via the teachers' perspective, it is best conceptualized as an outcome derived in part from the teachers' social or instructional interactions toward the child. Teachers' ratings of their relationships with children measure the extent to which students are able to successfully use the teacher as a resource in the classroom. Thus, although teachers' interactions with students are expected to influence relationships in important ways, these relationships are themselves key indicators of school adaptation. This conceptualization of relationships as outcomes was validated by a study showing that kindergarten teachers' perceptions of conflict with students were stronger predictors of behavioral functioning through the eighth grade than were these same teachers' ratings of behavior problems (Hamre & Pianta, 2001).

Globally, we expected that children in the risk groups would be more likely than children at low risk to benefit from placement in classrooms offering high levels of support and that placement in high-quality classrooms would help at-risk students catch

up to their low-risk peers. More specific hypotheses require a consideration of the mechanisms through which we expect the risk factors to operate. For example, children whose mothers have low levels of education tend to have less exposure to pre-academic experiences within the home (Bowman et al., 2001; U.S. Department of Education, 2000); thus, we expected that these children would benefit academically from high levels of instructional support within the classroom. In contrast, children displaying behavioral and social problems in kindergarten may require higher levels of emotional support to adjust to the demands of the first grade. However, by responding to children's social and emotional needs, teachers may not only help children adapt socially, but may allow these children to more successfully access the instructional aspects of classrooms; thus, we expected that high levels of emotional support would be associated with more positive academic experiences and lower levels of teacher-child conflict for children displaying multiple functional risks in kindergarten.

## Method

### *Participants*

Children included in this study took part in the NICHD Study of Early Child Care. The children's mothers were recruited from hospitals located in or near Little Rock, AK; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA, and Madison, WI. In 1991, research staff visited 8,986 mothers giving birth in these hospitals. Of these mothers, 5,416 met eligibility criteria and agreed to be contacted after returning home from the hospital. A randomly selected subgroup (with procedures to ensure economic, educational, and ethnic diversity) were contacted and enrolled in the study. This resulted in a sample of 1,364 families with healthy newborns. Details of this selection procedure are published in the study manuals (NICHD ECCRN, 1993).

Classroom observations were conducted in the children's second year of school, which for the majority was the first grade. Of the original sample of 1,364 children, 910 had complete data and were included in the current study. Analyses comparing the children included in this investigation with the entire sample indicate selected attrition: among all children who began the study, White children and those with mothers with higher education were more likely to have data collected in the first grade,  $\chi^2(3,$

$N = 1,364) = 18.14, p < .001$  and  $\chi^2(3, N = 1,364) = 16.75, p < .001$ , respectively. Among the children in the present study, 49% were female. The majority were White ( $n = 723$ ), followed in frequency by African American ( $n = 96$ ), Hispanic ( $n = 50$ ), and Other ( $n = 39$ ). Maternal education ranged from 7 to 21 years, with a mean of 14.45 years. The income-to-needs ratio, used to measure income relative to the number of household members, was average across the period of study (54 months, kindergarten, and first grade) and ranged from .15 to 33.77, with an average of 3.73. These factors indicate a largely nonpoverty sample, although there was considerable range.

### *Overview of Data Collection*

Children in this study were followed from birth through the first grade. Maternal education and child ethnicity were reported when children were 1-month old. Child outcomes and measures of classroom process were collected in the spring of the children's first-grade year. The 827 classrooms were distributed across 747 schools, in 295 public school districts, in 32 states. Earlier assessments, conducted when the children were 54 months and in kindergarten, provided measures of children's risk status as well as a measure of children's prior functioning on the outcomes of interest. Further documentation about all data collection procedures, psychometric properties of measures, and descriptions of how composites were derived are documented in the Manuals of Operation of the NICHD Study of Early Child Care (NICHD ECCRN, 1993).

### *Risk Indicators*

Children in this study were grouped based on their status on *functional* and *demographic* indicators of risk. Functional indicators of risk included measures of children's attention, externalizing behavior, social skills, and academic competence. The last three measures were collected through teacher report when the study children were in kindergarten. Unfortunately, individual child assessments were not conducted when children were in kindergarten. Because of an interest in including a non-teacher-reported risk variable and based on data showing the links between sustained attention and school failure (Gordon, Mettelman, & Irwin, 1994), the attention risk variable used in this investigation was collected during child assessments conducted when children were 54 months old. Students whose mothers had less than a 4-year college degree were placed in the

demographic risk group. Information on the measures and procedures used to identify children at risk of school failure is provided below.

### *Functional Risk*

*Sustained attention.* Sustained attention was assessed using a continuous performance task (CPT) based on the young children's version described by Mirsky, Anthony, Duncan, Aheani, and Kellam (1991). This measure consisted of a computer-generated task in which children are asked to push a button each time a target stimulus appears. The number of omission errors was used as the unit of analysis for this study. The CPT has adequate test-retest reliability ( $r = .65-.74$ ) and has high content and predictive validity (Halperin, Sharman, Greenblatt, & Schwartz, 1991).

*Externalizing behaviors.* Externalizing behaviors were assessed with the teacher report form (TRF; Achenbach, 1991), a widely used measure of problem behaviors that has been standardized on large samples of children. This measure lists 100 problem behaviors and has teachers rate them as not true (0), somewhat true (1), or very true (2) of the student. The externalizing problems standard score was used for these analyses. This scale contains teachers' reports on children's aggressive (e.g., gets in many fights; cruelty, bullying or meanness to others; physically attacks people), attention (e.g., cannot concentrate; fails to finish things he/she starts), and defiant behaviors (e.g., defiant, talks back to staff; disrupts class discipline). The reliability and validity of the TRF has been widely established (see Bérubé & Achenbach, 2001 for a review).

*Social skills and academic competence.* Students' social skills and academic competence were assessed with the social skills rating system-teacher form (SSRS; Gresham & Elliot, 1990). This measure consists of three scales: social skills, problem behaviors, and academic competence. Because the TRF is a more established measure of problem behaviors, only the social skills and academic competence scales were used in these analyses. The social skills composite asks teachers to rate the frequency of classroom behaviors (0 = never, 1 = sometimes, two = very often) in three areas related to positive social adjustment in school settings: cooperation (e.g., paying attention to instructions, putting away materials properly), assertion (e.g., starting conversations with peers, helping peers with classroom tasks), and self-control (e.g., responding to peer pressure appropriately, controlling temper). Within this sample, the coefficient  $\alpha$  for the social skills

composite was .93. The academic competence composite asks teachers to judge children's academic or learning behaviors in the classroom on a 5-point scale that corresponds to the percentage clusters of the students in the class (1 = lowest 10%, 5 = highest 10%). Within this sample, the coefficient  $\alpha$  for this scale was .95. Scores are standardized based on norms from a large, national sample of children. The SSRS has sufficient reliability and has been found to correlate with many other measures of adjustment (Gresham & Elliot, 1990).

*Functional risk status.* Students' risk status was determined for each of these four indicators. Children with standardized scores at least one standard deviation below the mean (85 or lower) on the social skills and academic competence scales were placed in the social risk ( $n = 83$ ; 10%) and academic risk groups ( $n = 112$ ; 13%), respectively. Similarly, children who fell one standard deviation above the mean on the number of omission errors on the CPT were included in the attention risk group ( $n = 144$ ; 17%). Consistent with recommendations in the TRF manual (Achenbach, 1991), children in the externalizing problems risk group had *T* scores at or above 62 on the externalizing problems factor ( $n = 80$ ; 9%). Given previous research indicating that multiple, rather than isolated, risks are most predictive of later problems (Gutman et al., 2003; Seifer et al., 1992), each child was given a risk score created by summing the number of risks. The children were then split into two groups, those with zero or one risk ( $n = 811$ ; 89%), referred to within the remainder of this report as displaying "low functional risk," and those with multiple risks ( $n = 99$ ; 11%), referred to as displaying "high functional risk." Among children in the low functional risk group, 73% had no risk factors and 25% had one risk factor. Among children in the high functional risk group, 73% had two risk factors, 21% had three risk factors, and 6% had all four risk factors. Among this high functional risk group, academic problems were most common (72%), followed by social skills problems (63%), attention problems (59%), and externalizing problems (36%).

### *Demographic Risk*

We were also interested in following the trajectory of children who have typically been identified as at risk of school failure—children whose mothers have low levels of education. Among this sample, 249 children (27%) had mothers with less than a 4-year college degree. This cutpoint was chosen to provide an adequate sample size and is validated as a risk

indicator in later analyses; implications of the moderate level of risk in this sample are included in the discussion. Ways in which school processes may moderate this risk factor were hypothesized to differ from the functional risk factor; thus, rather than composting demographic risk with those manifest in child behavior or skills, demographic risk was maintained as a separate indicator. Although low maternal education children were more likely than other children to display functional risks, the majority (78%) of those with low maternal education were in the low functional risk group.

### Child Outcomes

#### Achievement

Children's achievement was assessed with the Woodcock–Johnson Psycho-educational Battery-Revised (WJ-R; Woodcock & Johnson, 1989), a standardized measure of young children's academic achievement with excellent psychometric properties (Woodcock & Johnson, 1989). At each assessment point, several subtests were given out of the cognitive and achievement batteries. The cognitive battery included an assessment of long-term retrieval (Memory for Names), short-term memory (Memory for Sentences), auditory processing (Incomplete Words), and comprehensive knowledge (Picture Vocabulary). The achievement battery included measures of reading (Letter–Word Identification and Word Attack) and mathematics (Applied Problems). Memory for Names and Word Attack were only administered in first grade; all other tests were given at both 54 months and first grade. Because of the high levels of association between measures of cognitive ability and achievement, all subtests were composited at each time point, and are referred to for the remainder of this report as achievement scores. The coefficient  $\alpha$  at 54 months was .80 and at first

grade it was .83. Descriptives on the achievement battery are provided in Table 1.

#### Student–Teacher Relationships

Children's relational functioning was assessed with the Student–Teacher Relationship Scale (Pianta, 2001), a 28-item rating scale, using a Likert-type format, designed to assess teachers' perceptions of their relationship with a particular student. This scale has been used extensively in studies of preschool-age and elementary-age children (e.g., Birch & Ladd, 1997, 1998; Hamre & Pianta, 2001; Howes & Hamilton, 1992). The conflict scale assesses the degree of negative interactions and emotions involving the teacher and child and contains items such as, "This child easily becomes angry at me" and "This child and I always seem to be struggling with each other." Coefficient  $\alpha$  for conflict was .93 among this sample. Descriptives on the conflict scores are provided in Table 1.

#### Classroom Process

Classroom process was measured using the Classroom Observation System for First Grade (COS-1; NICHD ECCRN, 2002b). Trained data collectors observed each classroom on 1 day during the spring of the first-grade year. Classrooms were observed for approximately 3 hr during a morning-long period beginning with the official start of the school day on a day the teacher identified as being focused on academic activities. Observers made global ratings of classroom quality and teacher behavior using a set of 7-point rating scales. Some of the scales focused on global classroom quality and others focused specifically on the teacher's interaction with the study child. Global ratings of classroom-level dimensions included overcontrol, positive emotional climate,

Table 1  
Mean (Standard Deviation) on Academic Achievement (Woodcock–Johnson) and Student–Teacher Conflict by Time and Risk Status

	Kindergarten functional risk		Demographic risk (maternal education)	
	Low ( $n = 881$ )	High ( $n = 99$ )	Low ( $n = 661$ )	High ( $n = 249$ )
Woodcock–Johnson composite				
54 months	100.40 (10.79)	87.81 (10.42)	101.56 (10.50)	92.33 (11.24)
First	106.45 (9.78)	94.93 (10.42)	107.39 (9.58)	99.37 (10.54)
Student–teacher conflict				
K	9.80 (4.47)	15.74 (7.15)	10.00 (4.76)	11.74 (6.05)
First	10.28 (4.63)	14.59 (6.19)	10.32 (4.67)	11.91 (5.64)



negative emotional climate, effective classroom management, literacy instruction, evaluative feedback, instructional conversation, and encouragement of child responsibility. Rating scales for the teacher's behavior toward the target child included sensitivity/responsivity, intrusiveness/overcontrol, and detachment/disengagement. A summary of these ratings is provided in Table 2. A rating of 1 was assigned when that code was "uncharacteristic," a 3 was assigned when the description was "minimally characteristic," a 5 was assigned when the description of the code was "very characteristic" of the classroom, and a 7 was assigned under circumstances in which the code was "extremely characteristic" of the observed classroom or teacher-child interactional pattern.

Observers from all 10 sites trained on practice videotapes using a standardized manual that provided extensive descriptions of codes and anchor points. They trained on these videotaped observations prior to attending a centralized training workshop. After the training workshop, coders returned

to their sites, conducted pilot observations, and trained on one to two more videotaped cases. All observers had to pass a videotaped reliability test involving six cases. Criteria for passing were an 80% match (within 1 scale point) on the global rating scales. All coders passed at these levels on a reliability test before being certified to conduct observations in the field.

These scales were factor analyzed and averaged into two composite indicators of the classroom environment: emotional support and instructional support. The emotional support composite included ratings of overcontrol (reflected), positive emotional climate, negative emotional climate (reflected), effective classroom management, teacher sensitivity, intrusiveness (reflected), and detachment (reflected). The instructional support composite included ratings of literacy instruction, evaluative feedback, instructional conversation, and encouragement of child responsibility. These two composites are moderately associated with one another ( $r = .57$ ). Table 2 provides a summary of these scales. For details on

Table 2  
*Summary of COS-1 Ratings of Emotional and Instructional Climate*

Composite construct	Description (at high end)
<b>Emotional support</b>	
Teacher Sensitivity	The sensitive teacher is tuned in to the child and manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her behavior with the child
Intrusiveness (reversed)	An intrusive teacher imposes his/her own agenda on the child and interactions are adult-driven, rather than child-centered
Detachment (reversed)	A detached teacher shows a lack of emotional involvement and rarely joins in the child's activities or conversations
Positive climate	A positive classroom is characterized by pleasant conversations, spontaneous laughter, and exclamations of excitement. Teachers demonstrate positive regard and warmth in interactions with students
Classroom management	In a well-managed classroom, the teacher has clear yet flexible expectations related to the classroom rules and routines. Children understand and follow rules and the teacher does not have to employ many control techniques
Negative climate (reversed)	A negative classroom is characterized by hostile, angry, punitive, and controlling interactions in which the teacher displays negative regard, disapproval, criticism, and annoyance with children
Over-control (reversed)	The over-controlled classroom is rigidly structured and children are not given options for activities but instead must participate in very regimented ways
<b>Instructional support</b>	
Literacy instruction	This rating captures the amount of literacy instruction in the classroom. At the high end, the teacher frequently reads and teaches phonics and comprehension
Evaluative feedback	This rating focuses on the quality of verbal evaluation of children's work comments or ideas. At the high end feedback focuses on learning, mastery, developing understanding, personal improvement, effort, persistence, or trying new strategies
Instructional conversation	This scale focuses on the quality of cognitive skills or concepts elicited during the teacher-led discussions. At the high end children are encouraged to engage in conversations and expand on their ideas and perceptions of events. Teachers ask open-ended questions such as "what do you think?"
Encouragement of child responsibility	Children in classrooms high on this scale are encouraged to take on jobs, asked to offer solutions to classroom problems, and take responsibility for putting away materials, etc.

these composites and the training of observers refer to NICHD ECCRN (2002b). Of note is the fact that although only one observation was made for the majority of classrooms (one visit per child enrolled in the study), for almost 60 classrooms there was more than one child enrolled and hence more than one observation was conducted. For these classrooms, the correlations between pairs of the global ratings described above was, on average, higher than .70, indicating that these ratings reflect quite stable features of the classroom environment (NICHD ECCRN, 2004).

The COS-1 composites were used to categorize classrooms into offering high, moderate, and low support (using 33% cutpoints). We used these cut-offs, rather than continuous measures of classroom process, because of our interest in creating a natural experiment and decided on cutting the sample in thirds to capture adequate range while allowing for ease of interpretation and analysis. For emotional support, the 303 classrooms in the Low category ranged from a score of 15.33 to 38.83 ( $M = 33.15$ ;  $SD = 5.16$ ), the 313 in the Moderate category ranged from a score of 39 to 44 ( $M = 41.83$ ;  $SD = 1.58$ ), and the 294 in the High category ranged from a score of 44.33 to 49.00 ( $M = 46.53$ ;  $SD = 1.45$ ). For instructional support, the 289 classrooms in the Low category ranged from a score of 4 to 13 ( $M = 11.13$ ;  $SD = 1.76$ ), the 328 in the Moderate category ranged from a score of 14 to 17 ( $M = 15.41$ ;  $SD = 1.07$ ), and the 293 in the High category ranged from a score of 18 to 28 ( $M = 20.47$ ;  $SD = 2.15$ ).

## Results

### *Data Analysis Plan*

In order to establish whether instructional and emotional support in the first grade may moderate risk, we first had to establish two preconditions: (1) the existence of a natural experiment, in which children with varying risks backgrounds in kindergarten would sort into first-grade classrooms offering different levels of emotional and instructional support and (2) whether the hypothesized risk factors were associated with poorer outcomes in first grade. The first precondition was assessed through examining the distribution of children in each risk group into classrooms offering high, moderate, and low support. The second precondition was assessed by conducting ANCOVAs in which risk status was used to predict first-grade outcomes, after adjusting for children's previous performance on these outcomes measures.

Following these analyses, we turned to answering the main question of this study: does classroom support moderate children's risk of school failure? First, the instructional and emotional support variables were entered into the ANCOVA models to assess whether classroom support had a main effect on children's outcomes. Next, following the recommendations of Kraemer, Stice, Kazdin, Offord, and Kupfer, (2001) regarding testing the moderation of risk, a series of interactions were added to the model to test whether functional and demographic risks were moderated by classroom support variables. The relatively small *ns* among the risk groups provides for unbalanced ANCOVA designs. This situation may inflate Type I error and thus increase the likelihood that true effects are not statistically significant (Keselman, Cribbie, & Wilcox, 2002). Although not ideal, this analytic approach was determined to be most appropriate for testing the natural experiment described above and provides a stringent test of potential effects for placement in high-quality classrooms. Further details on these analyses are provided below.

### *Selection into High- and Low-Support Classrooms*

The distribution of classroom support among the risk groups is presented in Table 3. Children displaying high functional risk in kindergarten were as likely as those with low functional risk to be in classrooms offering high instructional or emotional support. Children of mothers with less than a 4-year college degree were somewhat more likely than their peers to be in first-grade classrooms offering low instructional or emotional support. Despite this differential placement based on maternal education levels, there were enough low and high maternal education students placed in each of the three levels of classrooms to exploit a natural experiment. The implication of this differential placement will be considered in the discussion.

### *Risks as Indicators of First-Grade Achievement and Relational Functioning Achievement*

In order to provide a robust test of associations between risk and outcomes, we adjusted for children's prior scores on outcomes. Descriptive information on both previous and first-grade outcomes are presented for each risk group in Table 1. Consistent with hypotheses, results of ANCOVAs suggest that after adjusting for children's achievement at 54 months, children whose mothers had less than a

Table 3  
 Percentage Placement in First-Grade Classroom Support (Instructional and Emotional) by Risk Status

	Kindergarten functional risk			Demographic risk (maternal education)		
	Low ( <i>n</i> = 881)	High ( <i>n</i> = 99)	$\chi^2$	Low ( <i>n</i> = 661)	High ( <i>n</i> = 249)	$\chi^2$
Instructional support						
Low	31.6	33.3	0.28	28.6	40.2	11.76**
Moderate	36.5	32.3		37.1	33.3	
High	31.9	34.3		34.3	26.5	
Emotional support						
Low	32.4	40.4	3.54	29.8	42.6	13.87**
Moderate	35.3	27.3		35.6	31.3	
High	32.3	32.3		34.6	26.1	

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

4-year college degree and those with high functional risk in kindergarten had lower achievement scores at the end of first grade (see Table 4). This suggests that not only do children at risk start school behind their low-risk peers, but the gap increases by the end of the first-grade year.

To test whether these risks may operate differently for boys and girls, interactions between each risk and child gender were initially included in the ANCOVA model. Because none of these interactions were statistically significant at the  $p < .05$  level, they were removed from the model.

### Relational Functioning

An identical set of analyses was performed to assess children's relational adjustment at the end of the first grade. Risk status was used to predict first-grade teachers' ratings of conflict with children, adjusting for kindergarten teacher ratings on this measure. Children in the high functional risk group had higher levels of teacher-rated conflict at the end of the first grade (see Table 4). Low maternal education did not arise as a significant risk factor for poor relational adjustment. As in the case of analyses

Table 4  
 Results of ANCOVAs Predicting First-Grade Achievement, Controlling for Previous Performance, From Risk and Classroom Process

	Achievement Woodcock–Johnson <sup>a</sup> ( <i>n</i> = 908)				Teacher–child conflict <sup>b</sup> ( <i>n</i> = 881)			
	Main effects		Moderation		Main effects		Moderation	
	<i>F</i>	Partial $\eta^2$	<i>F</i>	Partial $\eta^2$	<i>F</i>	Partial $\eta^2$	<i>F</i>	Partial $\eta^2$
Corrected model	152.17***	.57	78.45***	.58	31.38***	.22	22.03***	.23
Intercept	389.85***	.30	389.39***	.30	415.75***	.32	396.41***	.31
54 months WJ/K conflict	774.03***	.46	789.39***	.47	103.68***	.11	106.14***	.11
Female	12.80***	.01	13.59***	.01	20.77***	.02	20.64***	.02
Risk factors								
Maternal education—some college or less	8.97**	.01	8.335**	.01	0.74	.00	0.77	.00
High functional risk—kindergarten	14.92***	.02	13.20***	.02	23.58***	.03	19.27***	.02
Classroom process								
Instructional support	0.34	.00	0.13	.00	0.03	.00	0.60	.00
Emotional support	1.29	.00	3.20*	.01	2.30	.00	5.69**	.01
Risk $\times$ classroom process								
Maternal education $\times$ instructional support			6.68**	.02				
Maternal education $\times$ emotional support			1.82	.00				
Functional risk $\times$ instructional support			1.22	.00			0.69	.00
Functional risk $\times$ emotional support			4.57*	.01			3.62*	.01

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

on achievement, associations between risk and outcomes were not different between boys and girls and therefore these interactions were not included in the final model.

These analyses provide support for the conceptualization of risk within this study. Even after controlling for previous performance, children at risk were not performing as well by the end of the first grade as were their peers without these risks, suggesting that these are indicators of increasing gaps between children at risk and those who are not at risk. Furthermore, the analyses provide evidence of the independence of each domain of risk; in the case of achievement, both functional and demographic risk independently predicted poorer outcomes. Only functional risk predicted higher rates of conflict with first-grade teachers.

*Role of Instructional and Emotional Support in Moderating Risk Achievement*

Results presented in Table 4 suggest that neither support variable had a significant main effect on children’s achievement. Because both risk indicators significantly predicted poorer achievement in the first grade, interactions between maternal education and functional risk status with each of the classroom support variables were entered into the final ANCOVA model. The two-way interactions between instructional support and maternal education and between emotional support and functional risk status both explained significant variance in the final model (Table 4). Effect sizes (partial  $\eta^2$ ) were small; however, an examination of the estimated marginal means, presented in Figures 1 and 2, suggests that

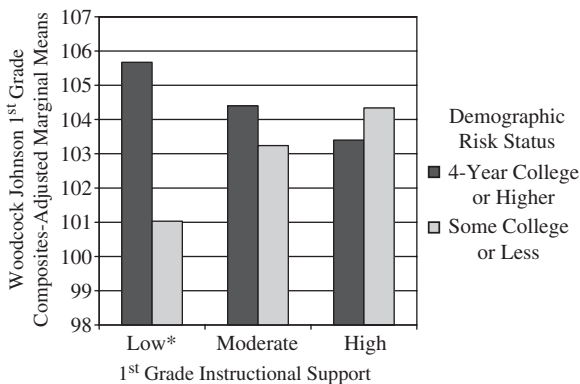


Figure 1. Woodcock–Johnson first-grade composites, adjusted for 54-month performance, by demographic risk status and first-grade instructional support.

\*Estimated means at this level have 95% confidence intervals that do not overlap.

differences were meaningful, particularly considering that these models controlled for previous performance on very stable measures of academic functioning and are attributable to a relatively short period of time, that is, 1 school year. Figure 1 shows that, consistent with hypotheses, among children whose mothers had less than a 4-year college degree, those in classrooms with moderate and high instructional support had achievement performance in the first grade (controlling for 54-month achievement) equal to their peers whose mothers had more education. In contrast, children at high demographic risk who were in low instructionally supportive classrooms were performing significantly below their peers with low demographic risk.

The main effect for the presence of high functional risk on achievement was moderated by the level of emotional support in the first-grade classroom (Table 4). Among children displaying high functional risk in kindergarten, those who were in highly emotionally supportive first-grade classrooms had similar scores on the first-grade Woodcock–Johnson as did their peers with low functional risk (see Figure 2). Children displaying high functional risk in kindergarten who were in low or moderately emotionally supportive classrooms had lower Woodcock–Johnson scores than did children in the low functional risk group.

*Relational Functioning*

As in predicting achievement, classroom support variables did not have a main effect on changes in student–teacher conflict ratings from kindergarten to first grade (Table 4). However, in support of hypotheses regarding the moderating role of classroom

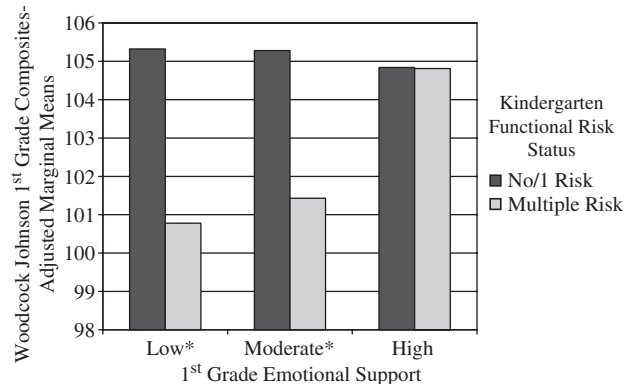


Figure 2. Woodcock–Johnson first-grade composites, adjusted for 54-month performance, by kindergarten functional risk status and first-grade emotional support.

\*Estimated means at this level have 95% confidence intervals that do not overlap.

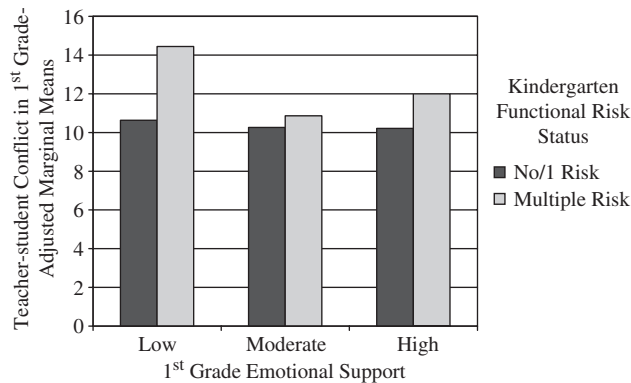


Figure 3. Teacher–student conflict in first grade, adjusted for kindergarten conflict, by kindergarten functional risk status and first-grade emotional support. \*Estimated means have 95% confidence intervals that do not overlap.

process on risk, the interaction between emotional support and child functional risk explained significant variance in the final model. Again, effect sizes (partial  $\eta^2$ ) were small. Among children displaying high functional risk in kindergarten, those in highly or moderately emotionally supportive first-grade classrooms had similar levels of conflict with teachers (adjusted for kindergarten conflict levels) as did their low-risk peers, while high-risk children in low emotional support classrooms had higher levels of conflict with teachers (Figure 3).

### Discussion

The current study provides evidence that across two important domains of child functioning in the early grades of school, achievement, and relationships with teachers, the quality of everyday classroom interactions in the form of instructional and emotional support moderates the risk of early school failure. In contrast to much of the research on school effectiveness, which has focused on structural indicators of classroom quality such as class size and teacher–student ratio (Rutter & Maughan, 2002), this study adds to the growing body of work documenting ways in which specific classroom processes facilitate children’s development (e.g., Connell & Wellborn, 1991; Hamre & Pianta, 2001; Ladd & Burgess, 2001; Morrison & Connor, 2002; Peisner-Feinberg et al., 2001; Stevenson & Lee, 1990; Wentzel, 2002).

Children within this study who were identified as at risk of school failure on the basis of displaying multiple problems within the kindergarten classroom, as well as children whose mothers had less than a 4-year college degree, all displayed lower levels of achievement at the end of first grade than did their low-risk peers, even after adjusting for

achievement performance at 54 months. These findings are consistent with others that suggest that children at risk of school failure may fall further behind academically with each successive year in school (Alexander et al., 2001; Entwisle & Hayduk, 1988). Yet not all children displaying early risk displayed academic problems at the end of the first grade, and both instructional and emotional support offered by first-grade teachers may be important in closing the gap in achievement between high-risk and low-risk children.

Consistent with recent views of effective teaching that focus on explicitness and intentionality (Dolezal et al., 2003; Matsumura et al., 2002; Morrison & Connor, 2002), high-quality instructional support in this study was observed when teachers made frequent and effective use of literacy instruction, evaluative feedback, instructional conversations, and encouragement of child responsibility. Among children in this study whose mothers had less than a 4-year college degree, those who were placed in first-grade classrooms offering high-to-moderate instructional support displayed similar levels of achievement at the end of the first grade as their peers with more educated mothers. In contrast, students with less educated mothers who were placed in classrooms offering low instructional support displayed significantly lower achievement at the end of the first grade than their low-risk peers, even after adjusting for prior (54 months) performance on the standardized achievement battery. Thus, just as Morrison and Connor (2002) found evidence that explicit teaching benefited students with reading difficulties more than it did students who did not display these early problems, this study suggests that focused literacy instruction, high-quality feedback, and the engagement of students in discussion of academic concepts may be particularly important in facilitating achievement gains for children with fewer socioeconomic resources. Stevenson and Lee (1990) report the value of similar focused, active teaching for achievement in older elementary students. This finding is also consistent with research on preschool settings, which generally finds the most significant cognitive effects of high-quality child care among children of fewer socioeconomic resources (e.g., Peisner-Feinberg & Burchinal, 1997), but is among the first to document a similar effect for natural variation (i.e., not the consequence of targeted interventions) in instructional processes in elementary classrooms. That effects on achievement were attributable to instructional support for children in the low maternal education group may reflect compensation for lower levels of language

stimulation and experiences with learning materials often reported in lower socioeconomic groups (Alexander et al., 2001; Hart & Risley, 1995).

Among children at high functional risk (those who displayed some combination of early behavioral, attentional, social, and/or academic problems) academic achievement in the first grade was highest for those in classrooms offering high emotional support. In these classrooms, teachers were aware of and responsive to individual students' needs, offered effective and proactive behavior management, and created a positive classroom climate in which teachers and students enjoyed each other and their time in the classroom. High functional risk children in these emotionally supportive classrooms had similar scores on the first-grade Woodcock–Johnson as their low functional risk peers, while high functional risk children in classrooms offering low or moderate emotional support displayed significantly lower levels of achievement than did their low-risk peers. Academic performance for students at high functional risk was not significantly moderated by the level of instructional support in the classroom. This finding is consistent with other work indicating that among children who have displayed difficulties adjusting to the classroom environment, having teachers who attend to their social and emotional needs may be as or more important to academic development than specific instructional practices (Burchinal et al., 2005; Hamre & Pianta, 2001; Noam & Herman, 2002; Pianta, 1999; Wentzel, 2002).

Theories seeking to explain the potential mechanisms of this connection between students' social and academic lives include social-motivation theories as well as work on student–teacher relationships. Wentzel (1998, 2002) has argued that positive interactions with teachers and peers can increase students' motivation and pursuit of academic goals. In this view, students who see teachers as supportive are more likely to pursue goals valued by teachers, such as engagement in academic activities. Consistent with this view is work on student–teacher relationships, which has suggested that stressful aspects of students' relationships with adults can lead to lower classroom participation and achievement (Ladd, 1989), while supportive relationships can help engage students in school (Furrer & Skinner, 2003). The current study extends these findings by suggesting that naturally occurring variation in teachers' emotional support can be important in enabling some children to make academic gains in early elementary school.

Beyond academic achievement, children's ability to develop a strong relationship with their teachers,

characterized by low levels of conflict, is a key indicator of positive school adjustment both concurrently and in the future (e.g., Hamre & Pianta, 2001; Ladd & Burgess, 1999; Ladd et al., 2002). This study provides evidence that for children who struggled in the prior year, their risk of developing conflictual relationships with teachers in the first grade is moderated by the quality of emotional support they received within their first-grade classrooms. Arnold, McWilliams, and Arnold (1998) have described ways in which interactions between teachers and children may resemble the coercive cycles between parents and children studies by Patterson and colleagues (Patterson & Fisher, 2002; Reid et al., 2002) with child misbehavior being influenced by and resulting in less positive interactions with teachers. Therefore, it is not surprising to find that, consistent with previous studies (Ladd & Burgess, 1999), children who have displayed multiple indicators of functional problems in kindergarten were more likely to develop poor relationships with teachers in the first grade. But when these children displaying high functional risk were placed with teachers offering high-to-moderate levels of emotional support, they did not differ significantly from their better-adjusted peers in levels of teacher-reported conflict. In contrast, children displaying high functional risk in kindergarten who were placed in classrooms characterized by low emotional support appeared to be particularly vulnerable to developing conflictual relationships with teachers in the first grade. This finding underscores the important role that teachers may play in interrupting cycles of coercive interactions with students (Arnold et al., 1998) and teacher–child relationships as a particularly important asset for children with social or relational challenges (Gregory & Weinstein, 2004; Noam & Herman, 2002). Future research may examine whether children at risk who are able to develop positive relationships with teachers show fewer behavioral and social problems in later school years.

There are several notable limitations to this research resulting from the fact that it was conducted using a large, existing data set, rather than data developed specifically to address the research questions. Most notably, although this study successfully identified children at risk of school difficulties, the fact that the overall sample was not highly at risk constrains our ability to generalize findings and may have led to smaller effect sizes than would be observed in a more highly at-risk sample. These results need to be replicated among other high-risk groups before more conclusive statements regarding the role of instructional and emotional support in moderat-

ing risk of school failure can be made. Secondly, the global composites used to define classroom process prohibit more specific statements about the types of interactions between teachers and children that may moderate risk. Global measures offer the benefit of allowing a more simplified characterization of classroom quality, but limit our understanding of the specific interactional processes that may be most important in classrooms.

Among their methodological recommendations for studying environmental effects on children's outcomes, Rutter and Maughan (2002) suggest directly testing competing hypotheses. One competing hypothesis not tested within this study concerns the direction of causality. This is a particular issue in the analysis on functional risk, as it could be argued that children displaying more behavioral, attention, academic, and social problems draw different types of interactions from teachers (e.g., Arnold et al., 1998). Although there was evidence that first-grade classroom support was independent of students' functional risk status, it is possible that children who ended up in first-grade classrooms offering higher support had made positive gains in the period not measured, between fall of kindergarten and the beginning of first grade. Having multiple measurements within each school year would enable more careful analysis of change across time.

Taken together, these findings provide evidence of the potential for schools to moderate children's risk of academic and relational problems. Although the effect sizes are small, the findings are notable given that these effects (a) were not because of a focused intervention but rather because of natural variation in everyday interactions, as observed on only 1 school day; (b) were observed over a relatively short period of time (1–2 years); and (c) were controlled for previous functioning on outcomes known to have high-to-moderate stability. Unfortunately, although these findings suggest possible pathways to reduce gaps between children in school performance, recent evidence suggests great variability in the quality of classroom environments as well as in the stability of quality from year to year, even within the same school (NICHD ECCRN, in press). If children are not systematically exposed to high levels of classroom support across time, the effects of such positive placements are likely to be short-lived. This is particularly concerning given the finding that students with lower levels of maternal education tend to be exposed to lower quality classroom environments.

Just as developmental psychopathology has focused on using knowledge about underlying

processes of adaptation to inform clinical practice (Hinshaw, 2002), school and educational psychologists, as well as developmental psychologists interested in school settings, would benefit from an increased focus on the processes underlying children's school adaptations (Pianta, in press). Research on these processes may be used to inform school-based interventions at the individual level, through working with teachers to improve the quality of their interactions with a specific student (e.g., Ladd et al., 2002; Pianta & Hamre, 2001), or at a more global level, through providing schools with professional development and measurement tools based on strong empirical evidence connecting specific classroom processes to more positive child outcomes. Furthermore, as school-based prevention and intervention efforts increasingly target improvements in the social and emotional climate of classrooms and schools as a means of facilitating children's development across academic, behavioral, and social domains (Greenberg et al., 2003), inclusion of measures of observed classroom processes will continue to expand our knowledge about specific classroom processes that are amenable to change and are associated with more positive outcomes for students.

Finally, from a theoretical perspective, the results of this study provide evidence of the benefit of understanding schools not only as a place to measure children's outcomes, but as an important context for children's development (Connell & Wellborn, 1991; Eccles, 1993; Pianta, in press; Roeser et al., 2000). Modeling the ways in which school experiences can add to, mediate, and moderate established trajectories of development allows for a more comprehensive understanding of children's adaptation (Cicchetti & Aber, 1998). Absent information on the process of schooling, and it is difficult to evaluate the legacy of early experience in the light of the possibility that school experience mediates or moderates the effects of prior history or concurrent experience at home. Given increasing evidence of the contribution of classroom process to school-age outcomes in the short term (e.g., Brody, Corsey, Forehand, & Armisted, 2002; Morrison & Connor, 2002; NICHD ECCRN, 2002b; Pianta et al., 2002; Rimm-Kaufmann et al., 2002), not modeling such effects could lead to overestimating the linear, direct association between early experience, and children's long-term outcomes. Integrating methodologies for measuring classroom process in programs of longitudinal research, conceptually and functionally, is essential to the advancement of increasingly comprehensive models of development.

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