Social Support and Achievement for Young Adolescents in Chicago: The Role of School Academic Press

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This study explores whether the social support that young adolescents may draw on for their academic activities is related to how much they learn in mathematics and reading over the course of a year. Data came from 1997 survey reports collected by the Consortium for Chicago School Research from 30,000 sixth and eighth graders in 304 Chicago public elementary schools about the support these students receive from their teachers, their parents, their peers, and their neighborhoods and from annual standardized tests conducted by the Chicago Public Schools. Using hierarchical linear modeling methods, we found that, on average, social support is positively but modestly related to learning. However, both learning and the relationship between social support and learning are contingent on the academic press of the school students attend. Findings are discussed within the context of school reform policies focusing on increasing social support.

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There is no absence of criticism of America's public schools, particularly schools located in our nation's largest cities. There are also many suggestions for how to "fix" them. A common thread among both reformers and scholars focuses on improving the human dimensions of schooling, particularly creating more personalized relationships between teachers and students. In this study, we focus on students' personal relationships, in and out of school, that are associated with their academic development.

Although different labels have been used to describe such relationships—social capital, personalism, personalization, sense of community, social networks, and social support—the ideas underlying these labels are quite similar. We use the term *social support* to designate the positive personal relationships that students have with people who may help them do well in school. In theory, students may draw support for their academic development from several sources. We focus on young adolescents' perceptions of support from four sources: their teachers, their parents, their friends, and the neighborhoods in which they reside. This kind of support is likely to come mainly from parents when children are young; as students mature, however, their network of social contacts expands. School and the relationships made in and around school take on increasing importance as children enter adolescence.

The importance of social support for learning, from the perspective of school reform, rests on an assumption that students with more support will learn more as a result. We examine the link between social support and student learning, thereby offering an empirical test of this assumption. We narrow the investigation in two ways. First, we focus on a critical developmental stage: young adolescence. Second, we concentrate our investigation in schools enrolling this age group in one large urban school district.

Students may or may not be able to draw on social support from various sources, and they also achieve at different levels. Not only do both social support and achievement vary among individual students, but they may also vary according to the schools the students attend. Moreover, how social support influences students' achievement and learning may be influenced by characteristics of their schools. Here we target an important aspect of school academic organization: the press the school exerts on its students toward learning activities and performance. We hypothesize that learning and the degree to which social support is related to learning are contingent on the academic press of the schools students attend.

We investigate these questions with data from close to 30,000 sixth and eighth graders enrolled in more than 300 Chicago public schools offering these grades. We draw our data from surveys administered to students, teachers, and administrators through the Consortium for Chicago School Research. We measure learning as the change over a single school year (1996–1997) in students' scores on standardized tests in mathematics and reading. Since our research questions, our hypotheses, and our data are multilevel (i.e., students are nested in schools), we use the hierarchical linear modeling (HLM) methodology.
The Role of School Academic Press

Background

Two Ideologies for Improving Student Achievement

Among the several ideologies underlying reforms designed to raise student achievement are two quite different approaches. One ideology uses a social support approach and focuses on the role of schools in providing affective connections among their members and with the broader adult community (Anson et al., 1991; Noddings, 1988). A second ideology centers on academic press. It emphasizes strict adherence to codes and values of academic performance, typically in a more competitive than cooperative environment (Phillips, 1997). Although these two means to improve children's learning are not necessarily contradictory, they are commonly presented as competing ideologies (Shouse, 1996). In the study described in this article, we focus on how the two constructs work in tandem rather than, as some argue, in opposition to one another.

We begin by reviewing both empirical and theoretical work underlying these two constructs. Empirical examination of "social support" draws together several distinct research strands rather than a discrete body of work. Although these strands share considerable conceptual overlap, work in one is typically not cited in another. The strands include research and writing about recent reforms that target the social dimension of schooling, school-based social capital, and the organization of schools as communities. Research on academic press is also distinguished by at least two strands. One focuses on teachers' expectations for their students' learning; another focuses on academic standards.

Social Support for Learning

Role in Recent Reforms

A major theme underlying the aims of the Annenberg Foundation, which recently committed $500 million to reforming urban schools, is to improve the personal relationships between children and adults in schools. An early document laying out the Annenberg Challenge addressed this theme directly. Among four guiding principles, "first the schools will arrange their resources so that each child shall be known well. The schools should wisely use that knowledge of each child to shape his or her schooling" (Annenberg Institute for School Reform, 1994, p. 2). Chicago's proposal to the Annenberg Foundation, resulting in a $49.4 million grant over 5 years, focused on creating "smaller, more intimate learning communities" (Chicago Annenberg Challenge, 1994, p. 4). The Chicago Challenge's first request for proposals to schools emphasized the need to "create conditions for a more personal and student-centered learning experience and to permit closer interactions between schools and families" (Chicago Annenberg Challenge, 1995, p. 4). Annenberg Challenge grants to several other cities (e.g., New York, Detroit, Philadelphia) stress this theme as well. Clearly, this current and generous national school reform effort identifies a key need in urban schools: to develop more positive social relations among school members.

A similar theme runs through the Carnegie Foundation's efforts to reform schools during the last decade. In its influential report on middle schools, Turning
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Points, a major recommendation was “to create small communities for learning” (Carnegie Council on Adolescent Development, 1989, p. 9). The first of six themes of Carnegie’s recent report about high schools, Breaking Ranks, is that “schools must break into units of no more than 600 students so that teachers and students can get to know one another” (National Association of Secondary School Principals, 1996, p. 5). Another major reform effort, the Coalition of Essential Schools, has been committed to changing secondary schools for more than a decade. Principle 4 of the nine principles that guide all coalition schools is similar: “Teaching and learning should be personalized to the maximum feasible extent” (MacMullen, 1996, p. 116). Coalition founder Theodore Sizer described “personalization of learning and instruction” as the goal underlying one of five imperatives for improving schools: keeping the structure simple and flexible (Sizer, 1984, p. 216; Sizer, 1992).

Conflicting Values

In the English lexicon, “support” can be either physical or emotional. In either manifestation, support provides aid or assistance and/or adds strength to that which cannot stand on its own. Social support describes the source of this aid: assistance from one’s social group or “society.” Support for learning defines the form or type of aid one might receive—to assist in developing academic prowess.

In this regard, social support for learning runs somewhat counter to a traditional value of American education, namely, that many tasks and performances are expected to be solo activities. For example, one of the most grievous offenses committed in an academic setting is cheating, which involves receiving help in performing a task one was expected to perform alone, without outside aid or assistance. However, there has been a gradual shift in educational beliefs about academic cooperation over the past quarter century, with increasing consideration of both the difficulty with which most individuals face the daunting task of learning and the value of social interaction in that process (Dorsch, 1998; Noddings, 1988). As a result, one finds increased emphasis on describing effective schools as places that are organized like small communities for learning (Dorsch, 1998; Lee, Bryk, & Smith, 1993; Newmann, 1990).

Communal School Organization

Relevant research on social support is found in work investigating “schools as communities.” Not only does this idea have a long and rich history (Bidwell, 1965; Dewey, 1943; Waller, 1932; Weber, 1922/1968), but it is well established in more recent writings (see Bryk, Lee, & Holland, 1993; Lee et al., 1993; Shouse, 1996). A thread describing the need for schools to provide informal connections between and responsibility for members runs through progressive reforms of the 1940s, through calls for communalism in the 1960s and 1970s, and into the present with the reminder that “it takes an entire village to raise a child” (Clinton, 1996). Bryk and Driscoll (1988) provide a conceptual development of these ideas. They relate communal school organization to two types of outcomes: teacher-student engagement and student achievement. Three core components of schools’ social organization represent the mechanisms through which this connection occurs: the degree to which members share (a) values and under-
standings, (b) a common agenda of activities, and (c) an ethic of caring. Our work is associated with the third component.

Research and writing about schools as communities and social support for learning share a focus on the social dimensions of schooling. However, there is an important distinction between these lines of research. Studies of schools as communities define the social dimension as an organizational property of schools (a macro-level construct), whereas research on social support typically focuses on social interactions among individuals (a micro-level construct). One study (Battistich, Solomon, Kim, Watson, & Schaps, 1995) considers the construct of community at both the micro and macro levels. In this study, we focus on the social support that is available to individual students rather than the social dimension of the school.

Social Capital and Education

Social capital, particularly as it relates to children's academic development, is similar to social support. There is, unfortunately, much ambiguity about the meaning of social capital in the educational context (Epstein, 1996), despite the intuitive appeal of this construct. It identifies a crucial observation about collective life: that the qualities of social relationships themselves either enhance or hinder our capacity to attain desirable social goods (Coleman, 1990; Dornbusch et al., 1996; Fukuyama, 1995). The idea is that benefits accrue to individuals from engaging in social relationships, and these benefits may serve as resources for them. Moreover, when social relationships encompass broader patterns of interaction between individuals, they can also serve as resources for neighborhoods, communities, and other social groups. Such exchanges of resources make not only individual but collective actions more effective.

Coleman (1988) pointed out the special significance of social capital for children. The responsibility for young children's early skill development rests with parents, but as they mature children's spheres of social relationships expand to include peers, other adults, and, of course, the school. The focus of developmental activities shifts from home to school when young people begin to spend more time engaged in formal education (Bronfenbrenner, 1979). Although the family and other social institutions continue to assist young people as they move into adulthood, the school has the primary responsibility for teaching the social and cognitive skills needed for successfully filling adult roles (Coleman, 1987). Thus, the social relationships developed in school become quite important.

Social capital represents the potential for more effective action embedded in social relationships; thus, it is seen as both an individual asset and a communal good (Coleman, 1990; Fukuyama, 1995; Furstenberg & Hughes, 1995; Lee & Croninger, 1998). Conceptualizations of social capital may thus create a useful link between micro and macro theories of human behavior. At the micro level, social capital functions as a social-psychological resource on which individuals may draw to pursue their interests. At the macro level, it includes norms, traditions, and behavior patterns that shape both the goals people pursue and their opportunities for doing so. Conceptualizing social capital requires theoretical and analytic considerations at both levels.
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A recent paper provides some conceptual development of this construct as it relates to schools (Lee & Croninger, 1998). The authors distinguished between mechanisms through which social capital may influence student development and qualities of social capital itself. They identified six elements: Three are qualities (its uses, its location, its intentionality), and three are mechanisms (volition, impetus, and norms). A link between social capital, as conceptualized in that study, and social support, as used here, is "location": This quality corresponds to sources of social support. Another parallel is a stress on a link between social support (or social capital) and students' academic development. Our work connects to social capital at the micro level.

Academic Press

Organizational Press

In organizational theory, the "press" experienced by members toward (or away from) particular goals, behaviors, and beliefs is derived either from a need for belonging (Lewin, 1936) or from a desire to demonstrate competitive superiority in achieving some desired outcome (Pace & Stern, 1958). Regardless of what motivates it, the aim of organizational press is conformity: pressure toward a common purpose from which school members are not expected to deviate. The idea is that the organization sets a normative environment that motivates its members to behave in desirable ways.

Press in Schools

In the current climate, the content of reform is typically toward raising and maintaining academic standards. McDill, Natriello, and Pallas (1986) define academic press as the extent to which school members (teachers and students) experience a normative emphasis on academic excellence and conformity to specified academic standards. They identify three assumptions underlying recent (and strident) calls for higher standards: (a) that standards in the nation's schools are too low, (b) that higher standards will lead to greater effort on the part of individual students, and (c) that such effort will lead to higher achievement.

There is a historical background to the national move to increase academic press in our nation's schools as a way to change students' and teachers' behaviors. Recurring discussions involve enduring struggles over a common core curriculum (Wilcox, 1997), debates concerning curriculum tracking (Oakes, 1985; Powell, Farrar, & Cohen, 1985), and arguments that focus on increasing academic rigor to match other countries (Geary, 1996). A strong academic focus is often identified as an important factor defining effective schools (e.g., Edmonds, 1979; Good & Brophy, 1986; Murphy, Weil, Hallinger, & Mitman, 1982; Purkey & Smith, 1983).

There is empirical evidence to link a strong press for academic success with greater student effort, more time spent on academic tasks, and higher student performance (Lee et al., 1993, review this work). However, there is concern for potential student alienation in high schools that enroll substantial proportions of low-achieving students, when academic standards are raised beyond what stu-
students can reasonably attain (McDill et al., 1986; Wehlage, 1989). In elementary schools, educational psychologists have made distinctions within the academic emphasis construct (of classrooms, not of schools) into goals for performance or for mastery. Researchers report more learning in classrooms typified by mastery than performance goals (Harackiewicz & Elliot, 1998; Seifert, 1995; Weinstein, 1991). These findings emphasize the importance of a strong academic orientation (as opposed to social or interpersonal goals) for younger students' learning.

At least two factors may motivate schools to press their students toward higher academic performance: (a) teachers' expectations for student performance and (b) externally imposed standards on schools—from the district, the state, the nation, or from several sources. These factors differ in locating the motivating force for academic press within or outside the school.

**Teachers' Expectations for Student Performance**

The controversial Pygmalion study (Rosenthal & Jacobs, 1968) set off a flurry of research about whether (and how) teacher expectations shape student learning (e.g., Cooper, 1983; Good & Brophy, 1986; Nash, 1976; Raudenbush, 1984). The conclusion, which has weathered much criticism over experimental design (e.g., Elashoff, 1971; Locurto, 1991), is straightforward: Teachers' expectations influence how much children learn in the classroom (Raudenbush, 1984; Rosenthal, 1995). This result has both positive and negative connotations. Although it encourages teachers who expect much of their students to help these students learn, it also suggests that harmful consequences accrue when teachers do not believe that their students can learn what they are taught.

Teachers' expectations for students' performance can also be examined as an organizational property of schools. High expectations, communicated between teachers, engender mutual support for academic objectives. Thus, a norm of high expectations is part of a school's social context, encouraging an organizational press toward academic goals (Baker, Terry, Bridger, & Winsor, 1997; Darling-Hammond et al., 1983; Evans, 1997). Lee and Smith (1996) found that teachers' collective responsibility for student learning influenced high school students' learning. When a climate of low expectations is evident, however, teachers feel free to abandon an academic agenda. Teaching is seen as difficult, even unreasonably so, given what students are expected to achieve. Lowered expectations, typically associated with student background, allow teachers to reduce the pressure on students, whose social disadvantage is seen as a major barrier to their success in school (Lakebrink, 1989; Lambert & McCombs, 1998; Miller & Shouten, 1989; Wehlage, 1989). The level of expectations held by a school's teachers for students is a "brick" upon which the structure of academic press for (or relaxation of) academic goals is built.

**Standards-Based Reform**

Externally set standards serve as extrinsic motivations for academic press. One justification is that academic standards need to be competitive. A functionalist strand of contemporary school reform, standards-based reform, is fueled by fear that the nation's school curriculum is insufficient for competition in the global or
domestic employment markets (Cobb, 1994). National standards for curriculum and instruction are intended to help schools create exemplary practices through accountability mechanisms (King & Mathers, 1997). Policy groups, including local school boards, state agencies, and federal organizations, have established elaborate standards for what children should learn in school, how it should be taught, and what should be tested at each grade level (National Council on Education Standards and Testing, 1992).

Accountability to standards creates pressure on school members to meet goals, pressure that is imposed by an outside agency. Methods to enforce this type of accountability vary, but money is usually at the heart of it (King & Mathers, 1997). Schools that do not meet the standards can expect to be punished financially, whereas more successful schools are rewarded for their success. This type of reward structure is paradoxical; resources needed to improve a floundering school are rescinded at the very point that schools discover (or are shown) the problem itself (Darling-Hammond, 1997). Nevertheless, rewards and punishments for meeting standards do impose pressures to which schools respond by increasing emphasis on those goals. How such pressures affect teachers is unclear (Myers, 1998), although they result in some type of academic press.

Studies Combining Social Support and Academic Press

Only a few studies consider social support and academic press together, and most consider the influence of these constructs on students' academic development. All are quite recent, and most use multilevel statistical methods. The relevance of these studies for our work leads us to provide a bit of detail about each. They typically consider social support at the macro level. That the conclusions from these studies are not consistent is unsurprising, given the variety in both the definitions of social support and the student samples. We review them in chronological order.

Communal School Organization and Students' Interest in Academics

An important element differentiating Catholic and public high schools, according to Bryk et al. (1993), is the schools' communal organization. Using large samples, nationally representative data, and multilevel methods, the authors measured this element with a composite index containing 23 items separated into three components of the academic and social elements of school life: shared values, shared activities, and social relations. Catholic high schools scored more than 2 standard deviations higher on the communal school index than their public counterparts. The authors examined the effects of communal organization, indirectly, on several measures of teachers' commitment and students' engagement (but not achievement). They argued that "the major effects of a communal school organization on teachers and students ... are located more directly in the personal and social rather than in the academic domain" (Bryk et al., 1993, p. 276).

The outcome most relevant here, students' interest in academics, was modestly but positively correlated with the communal school index ($r = .15$). Using a two-step process that equated the sample for selectivity differences among
teachers, students, and schools, the authors first estimated sector differences on the outcomes. In the second step, they estimated the same effects after taking communal school organization into account. In the first step, the Catholic school advantage in terms of students' interest in academics was substantial. However, once the communal school index was included in the analysis, the Catholic school advantage on this outcome disappeared. From their results, the authors concluded that if public schools were organized as communally as Catholic schools, there would be no sector difference in students' interest in academics.

"Sense of Community," Academic and Social Attitudes, and Performance

Battistich et al. (1995) explored these relationships in elementary schools. Using data from a nonrandom sample of four elementary schools in each of six school districts (i.e., 24 schools), these researchers assessed "sense of community" with survey data from students in Grades 3–5. They created a 38-item scale that included subscales measuring caring and supportive interpersonal relationships in classrooms and schools and student autonomy in setting classroom policy and decision making. With multilevel methods, the authors assessed the effects of sense of community, at both the micro and macro levels, on a broad set of outcomes measuring students' academic attitudes and motives, assessments of academic performance, and social and personal attitudes and behaviors. In this study, school academic press was not considered. Rather, the study focused on students' academic (and social) attitudes and behaviors as outcomes. In general, the proportion of variance between schools on the attitudinal and behavioral outcomes was low (typically less than 10%); it was higher for standardized tests.

At both the micro (students' sense of community) and macro (school community) levels, "community" was positively associated with students' academic attitudes and motives, as well as with their social and personal attitudes, motives, and behaviors. However, there were few effects of school community on the academic performance outcomes at either the micro or the macro level. Effects were generally consistent across schools with different concentrations of poverty.

Organizational Explanations for Social Support

Within their definition of authentic pedagogy and achievement, Marks, Doane, and Secada (1996) combined two ideas separated in most of the other studies: (a) teachers' expectations and (b) support from teachers to help students meet those expectations. Thus, unlike other studies, these authors' definition of social support includes an element of academic press (i.e., high expectations). The authors drew their conclusions from surveys of students and from extensive fieldwork in 24 elementary, middle, and secondary schools, all of which were substantially "restructured." The authors' purpose was to explain "why some schools were more successful than others in offering support for achievement of high intellectual quality" (Marks et al., 1996, p. 218). Two explanations were offered: (a) strong professional communities and (b) structures and cultures that mutually encourage learning of high intellectual quality.
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Communal School Organization, Academic Press, and School Socioeconomic Status

Shouse (1996) used a large sample, nationally representative data, and multi-level methods in a study of the influence on students’ achievement gains of both school communal organization (similar to the measure used by Bryk et al., 1993) and academic press (a composite of many items measuring the schools’ academic and disciplinary climate). Controlling for students’ academic and social background and school sector, Shouse investigated whether the effects of communal school organization and academic press on learning were contingent on the socioeconomic status (SES) of the school.

Academic press influenced achievement gains in all schools, but its effect was stronger in low-SES schools. Interestingly, although there was no main effect of communal organization on achievement gain, academic press had a very strong influence on achievement gain in low-SES schools that were communally organized. However, in low-SES schools with average or weak communal organizations, academic press effects on achievement were weaker. Shouse (1996) concluded that academic press is more important in low-SES schools, although typically such schools are less demanding academically. Based on a significant three-way interaction, he concluded that “more equitable outcomes may be attained by coupling high academic demand and strong individual support” (p. 194). However, he did not actually measure social support at the individual level.

Comparing Effects of School Communal and Academic Climate

Phillips (1997) was critical of the studies described in the preceding paragraphs. In particular, she suggested that the various measures of school communal organization used in these studies were ill conceived, in that they included teachers’ consensus about academic as well as social values. Her study used multilevel methods and data from 23 middle schools in one suburban district with a large African American enrollment of middle- and working-class students (i.e., there were no very poor students in the district she studied). Rather than creating single composite measures of the two types of school climate she considered—communitarian and academic—she used separate measures (some were highly intercorrelated). Measures of communal climate included shared values, democratic governance, positive teacher relations, and teachers’ caring for students. She was careful not to include academically related items in these composites. Academic climate was measured by teachers’ expectations, homework assigned, and the proportion of students taking algebra (also strongly interrelated).

Phillips estimated the effects of the separate measures of each type of climate on achievement and school attendance and included controls for student academic and social background and school demographics. In general, effects were stronger on achievement than attendance, consistent with her conceptualization of the competing (rather than complementary) nature of these two types of climate. The academic climate measures had stronger effects than the communal measures. Teachers’ caring for students was negatively related to both outcomes.
(the only negative effect of a social support measure in any study we reviewed). Based on these results, Phillips concluded that current models of school effectiveness focused on communal organization may be misguided. Hers was the only study we reviewed that reached this conclusion.

School Organization and Student Achievement

Using nationally representative data and multilevel methods, Lee, Smith, and Croninger (1997) found that features of school organization explained away the effects of school restructuring practices on gains in achievement and the social distribution of achievement. Their measure of school social organization—teachers' collective responsibility for learning—is similar to social support. The study included several measures of school academic organization, including academic press. Analyses also included controls for students' academic and social background, school demographics, and other features of academic organization (e.g., average course taking, authentic instruction). Students in schools characterized by more collective responsibility for learning and higher academic press gained more in mathematics and science achievement. Achievement gains were also more equitably distributed by student SES in high schools characterized by higher levels of academic press.

Summary

Two major reform models for improving students' school performance focus on improving schools' social and academic organizations. In general, researchers and policymakers alike have coalesced recently around a recognition of the importance of the social dimension of schooling; the goal of improving schools' academic focus is more enduring. Most studies that investigate the effects of these two organizational features of schools on students' academic development identify positive effects for both. In general, social support had stronger effects on attitudinal measures, whereas the effects of academic press were stronger on academic outcomes (e.g., achievement). Across studies, there is little consistency in how these constructs are measured (especially social support), nor are studies consistent in whether social support is (or should be) conceptualized as a resource accruing to individual students inside schools or as a collective resource representing an organizational dimension of schooling. There is considerable agreement that increasing academic press (or "organization" or "climate") is an appropriate direction for reform. Whether reforms targeted on changing the academic and social domains of schools are contradictory or complementary is an area of disagreement in the research.

Our Approach

In this study, we depart from much of the extant research in two respects: (a) We measure social support as a resource upon which individual students may draw (i.e., a micro-level social-psychological construct), and (b) we explore effects on young adolescents in the context of elementary schools. The micro approach recognizes that students' experiences in the same school (both social and aca-
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demic) may be quite different. Although we use a composite support measure (similar to most studies), we include students' reports of support from several sources (teachers, parents, peers, neighborhoods). Our approach for measuring academic press is more consistent with the literature: We consider this as a macro-level organizational feature of schools. We draw our information about school academic press from both teachers and students.

Research Questions

We organize our investigation around three related research questions, the last one of which requires a positive response to the previous two. Although our empirical investigation of these questions is located in the context of middle-grade students in Chicago elementary schools, the questions themselves depend on neither the grade level of the students nor the setting of the study. With each question, we pose hypotheses about the results we expect, based on theory and evidence from the literature.

Research Question 1: Social support and learning. Do students who perceive that they have more social support for learning from teachers, parents, peers, and community actually learn more, as measured by their 1-year gains in achievement in mathematics and reading? We hypothesize that social support is positively related to learning in both subjects.

Research Question 2: School academic press and learning. Do students in schools with higher levels of academic press learn more in mathematics and reading? We expect that school academic press is associated with higher average levels of learning in these subjects.

Research Question 3: Academic press, social support, and learning. Is the relationship between social support and students' learning in mathematics and reading associated with the academic press of their schools? We hypothesize that this relationship varies across schools and that it is contingent on the academic press of the school. Specifically, we expect that the relationship between social support and learning is stronger in schools with more academic press.

Conceptual Model Guiding the Study

Social Support and Achievement

Our analyses of these research questions are organized around the conceptual model shown in Figure 1. Research Question 1, which focuses on the relationship between social support and achievement, is investigated with information about students (the lightly shaded boxes in Figure 1). The heavy lines surrounding the boxes designating the constructs of social support and achievement indicate their importance in this study.

Achievement, social support, and the relationship between them are all potentially associated with characteristics of students (especially their social and academic backgrounds). Therefore, we take into account several factors that measure student background. Because we are actually more interested in effects on learning than on achievement status, the single most important background measure is students' prior achievement.
Figure 1. Heuristic model relating social support, school academic press, and achievement in Chicago elementary schools

A School Effects Study

This study, which examines how characteristics of their schools influence students’ outcomes within schools, falls into a type of inquiry called “school effects research.” In our model, school characteristics are listed in the box in Figure 1 shaded in a darker gray. Here we focus on one particular characteristic of schools’ academic organization: academic press. Its importance in the model is suggested by the heavy line outlining it. We explore the influence of school academic press on two types of outcomes: (a) student achievement and (b) the relationship between social support and achievement (these correspond to Research Questions 2 and 3). Estimating the effects of academic press on these outcomes takes into account both students’ academic and social backgrounds and also several characteristics of schools. In this instance, we control for features of school
structure and social composition. We estimate the relationships indicated by the arrows in Figure 1 with multilevel statistical methods.

Method

Sample and Data

The data for this study come from the Consortium on Chicago School Research. Organized in 1990, the Consortium is “an independent affiliation of researchers from universities, advocacy groups, and the school system . . . [that conducts] studies to examine the implicit theory behind decentralization, and how it was actually unfolding in elementary schools” (Bryk, Sebring, Kerbow, Rollow, & Easton, 1998, p. xv). Since 1991, the Consortium has conducted ongoing surveys in Chicago public schools, organized in part to assess the impact of the Chicago School Reform Act of 1988. Chicago’s teachers, principals, and students are surveyed periodically.

The surveys from which we draw our data were conducted in winter 1997, when the Consortium surveyed all 6th-, 8th-, and 10th-grade students; all teachers; and all principals in the Chicago Public Schools (Bilcer, 1997). The 1997 surveys were a combined effort of the Consortium and the Chicago Annenberg Study Project. The latter is a multiyear program documenting and studying the activities of the Chicago Annenberg Challenge. The Chicago Challenge was organized to manage and distribute the funds from a generous 5-year grant from the Annenberg Foundation to the Chicago Public Schools. Our data are drawn from surveys of teachers and students, as well as standardized test scores from the annual assessments of Chicago’s elementary school students.

Our sample includes the 304 Chicago elementary schools that enroll students in both the sixth and eighth grades. Therefore, we eliminated a few schools that did not offer both grades. We also eliminated a small number of students who did not have mathematics and reading scores available in both 1996 and 1997. The survey response rate for elementary schools was high (88%). Within the 304 schools, our study sample includes 28,318 sixth- and eighth-grade students (an average of 93 students per school).

Measures

Students

The sample of students is equally divided into sixth (50.1%) and eighth (49.9%) graders. The major dependent variables are students’ scores on the 1997 mathematics and reading portions of the Iowa Test of Basic Skills (ITBS), administered in winter 1997. Students’ annual test scores are part of the large database for the Chicago Public Schools available to Consortium researchers. The 1997 test scores were in grade-level equivalents. Because we wanted to combine the sample of sixth and eighth graders, we transformed the test results into z scores ($M = 0, SD = 1$), standardizing each around its grade-level mean (sixth or eighth). Before transforming, the 1997 grade-equivalent math scores were 6.5 for sixth graders and 8.3 for eighth graders. In reading, the grade equivalents were 6.1 for sixth graders and 8.1 for eighth graders. Details of the construction of measures used in the study are provided in the Appendix.
The major independent variable is social support for learning. This factor-weighted composite is drawn from four measures, each of which taps students' reports of support they receive from teachers, parents, peers, and the community. The measure of teacher support "gauges whether students perceive that their classroom teachers give them individual attention and show personal concern for them" (Bilcer, 1997, p. 72). The measure of support from parents "gauges student views of their parents' support for their school work" (Bilcer, 1997, p. 68). The measure of support from peers asks students whether "their classmates treat each other with respect, work together well, and help each other learn" (Bilcer, 1997, p. 70). The measure of support from the community "assesses whether students trust and rely on neighbors and community members and whether they know and care about each other" (Bilcer, 1997, p. 64). The individual items included in each of these measures are listed in the Appendix. The composite measure is a \( z \) score \( (M = 0, SD = 1) \) and is normally distributed.

The major control variables are students' scores on the same tests the previous year (1996), \( z \)-scored around grade-level means in the same manner as the 1997 test scores. Before transforming, the 1996 math and reading scores were (respectively) 5.5 and 5.2 for sixth graders and 7.2 and 6.8 for eighth graders. In addition to the previous year's test scores, we include controls for students' SES (a \( z \) score) and a dummy-coded race/ethnicity measure comparing Black students (55.1% of this sample of students, coded 1) with other students (together coded 0). The noncoded comparison group includes Hispanic (29.1%), White (12.4%), and Asian (3.4%) students. We also include dummy-coded (0, 1) indicators measuring gender, whether the student is 2 or more years overage for his or her grade (16% were overage), mobility (i.e., the number of times the students had changed schools since 1994, which averaged 0.7), and a grade-level indicator.

**Schools**

The major school-level independent variable in this study is school academic press. This composite is the \( z \)-scored mean of two measures, each separately aggregated to the school level before they were averaged. One measure, taken from the 1997 teacher survey, "gauges the extent to which teachers feel their school's goals and actions are focused on improving student learning" (Bilcer, 1997, p. 47). The second measure, from the 1997 survey of students, "gauges whether students feel their teachers challenge them to reach high levels of academic performance" (Bilcer, 1997, p. 55). The composite is normally distributed.

We included two sets of school-level control variables: (a) those describing structure and (b) those describing social composition. We measure social composition with several variables, including the proportion of low-income students (an average of 82.6% low-income students in this sample of schools). Another set of variables describes school racial composition, which we measure with a set of dummy (0, 1) variables. The most common racial designation, schools that are predominantly Black (46.2%), is the uncoded comparison group. Predominantly minority schools compose 14.5% of the sample; 8.2% of the schools are predominantly Hispanic, 11.8% are racially mixed, and 20.1% are racially integrated.
Lee and Smith

Several variables measuring structure are included. One is school size. We divided the variable measuring 1997 school enrollment into three categories: small schools (350 students or less), medium-sized schools (351–750 students), and large schools (more than 750 students). From this we created two dummy-coded (0, 1) variables, one for small schools and the other for large schools. Thus, in multivariate analyses, both large and small schools are compared with middle-sized schools. Because the students in this study are in the middle grades, we created a dummy-coded (0, 1) indicator designating schools that offer programs focusing on special reforms targeted at the middle grades (2.5% of the schools do so). A few are stand-alone middle schools. Because this study is conducted in conjunction with the Annenberg Study Project, we created two dummy-coded (0, 1) indicators of Annenberg involvement: (a) receipt of an Annenberg planning grant (but not an implementation grant) by a school and (b) receipt of Annenberg implementation grants by a school. The uncoded comparison group is schools without Annenberg funding. Because this study used data collected in the very early years of Annenberg funding to Chicago schools, we have no hypotheses about effects of involvement in Annenberg programs.

Analytic Approach

Multilevel Questions and Method

The research questions around which the study is organized are multilevel, consistent with most studies that explore school effects. Addressing these questions involves estimating the effect of social support on achievement (Question 1), the effect of academic press on students’ achievement (Question 2), and the effect of academic press on the relationship between social support and achievement (Question 3). We used a multilevel analysis method: HLM (Bryk & Raudenbush, 1992). Because its use in school effects studies is, by now, common, we provide only a brief explanation for readers who may not be familiar with it.1

Students’ scores on the 1997 ITBS mathematics and reading tests are the major dependent measures in two-level HLMs. The intercepts (school average achievement) become dependent variables in school-level models. At Level 1 (within schools), students’ mathematics and reading achievement scores are adjusted for their achievement on the same tests the previous year (1996), social support, demographic characteristics, mobility, and being overage.2 There are four dependent measures in the Level 2 analyses (between schools), each of which is adjusted for students’ social and academic backgrounds: two intercepts (1-year achievement gains in mathematics and reading) and two slopes (the relationship between social support and gains in both subjects). These outcomes are measured for sixth and eighth graders in Chicago elementary schools.

At Level 2 (between schools), we evaluate how school academic press influences learning in these subjects (Research Question 2). Our Level 2 HLM models estimate the effect of academic press on students’ learning in mathematics and learning over the 1996–1997 school year. In the same model, we also investigate whether school academic press influences the social support/learning slope in each school (Research Question 3). These analyses take into ac-
count differences among Chicago elementary schools in their structures and social compositions.

**Relationship Between Social Support and Learning**

In substantive terms, what does this relationship mean? The hypotheses posed at the outset suggested that we expect social support to be positively related to learning. The reforms aimed at increasing social support assume that students will learn more as a result. Other HLM studies have explored the social distribution of achievement (e.g., Bryk et al., 1993; Lee & Smith, 1995, 1996), focusing on the relationship between social background factors (SES and/or minority status) and achievement. In the case of SES, a positive relationship indicates social inequity in schools. Those who are interested in socially equitable schooling (and we put ourselves in that category) would like to see that relationship low. A flat slope indicates a socially equitable distribution of achievement.

How should we consider the relationship between social support and learning? Is it also a measure of social equity in schools? Yes and no. Hypotheses flowing from reforms such as those sponsored by the Annenberg Foundation would expect a positive relationship. However, if this slope is positive, it also indicates inequity of a sort. If students with more social support learn more, students with low levels of support would learn correspondingly less. School reforms aimed at increasing social support surely want high levels of support for all students. We recognize that there is a flip side to the argument. Through examination of this phenomenon among individual students in the same school, some students' learning might benefit as a result of their receiving more support—and some students' learning could suffer as a result of lower levels of support. We recognize the inevitable issue of social equity (and inequity) in interpreting results with support/achievement slope as an outcome. In that respect, this is similar to the more familiar SES/achievement slope.

**Presentation of Results**

Because the variables used in this study are either dummy-coded categorical variables or z-scored continuous variables (i.e., scaled around the mean for students in this sample), multivariate results are presented in the metric of Chicago-specific student-level standard deviation units. Readers may compare the magnitudes of the effects in a common metric: standard deviation units on the two achievement tests. However, we present our final results in graphic form. For that presentation, we convert all results into between-school standard deviations. Our rationale is that school effects can influence only the proportion of variance in achievement that lies systematically between schools.

**Results**

**Descriptive Findings for Students and Schools**

*Grouping Schools by Academic Press*

We present descriptive information, for students and schools, on all variables used in this study. Because we investigate the effects of school academic press,
we have grouped students and schools this way in Table 1. We divided the 304 Chicago elementary schools into three groups based on their level of academic press. “Low” (n = 85) and “high” (n = 75) categories each contain about one fourth of the schools, with a “medium” academic press group containing about half of the schools (n = 144). Using these groupings, we then divided both students and schools by these categories. We computed these subgroup means using one-way analysis of variance. For each variable describing students and schools, we tested two contrasts: (a) low- versus medium-press schools and (b) high- versus medium-press schools. These descriptive results, in Table 1, also indicate statistically significant group differences.

Descriptive Findings for Students by School Academic Press

Because sample sizes in the three groups are large (7,984 students in low-press schools, 14,175 students in medium-press schools, and 6,159 students in high-press schools), almost all group mean differences are statistically significant among students (Table 1, top). In 1996 as well as 1997, test scores in both math and reading follow a consistent pattern. Students in low-press schools score about 0.20 standard deviations below those in medium-press schools; those in high-press schools score between 0.25 and 0.30 standard deviations above the students in medium-press schools. There is a consistent pattern to these group means: Student achievement is positively related to school academic press.

The same pattern is evident for social support; although smaller in magnitude (about 0.15 standard deviations), the group mean differences indicate that social support is related to school academic press. Several measures of students' social and academic background follow the same pattern; group means for SES differ by about 0.20 standard deviations, with higher SES students in schools with more academic press. Proportions of overage students are inversely related to academic press; although small, differences are statistically significant. This pattern also characterizes student mobility: The numbers of school changes are fewer as school academic press increases.

The distribution of students by race/ethnicity is less consistent. For example, there are more Black students in medium- than low-press schools; the fewest are in high-press schools. There are more Hispanic students in low- than medium-press schools. Although Asian students are not numerous in Chicago schools, the proportions of Asian and White students are consistent: Proportions of Asian and White students rise as academic press increases. Unsurprisingly, students are distributed evenly in the three groups of schools by grade level and gender. Although these descriptive differences suggest that achievement and social support are positively related to school academic press, differences in social and academic background across the school groupings indicate that school composition may account for these relationships.

Descriptive Findings for Schools

Group mean differences for schools are also presented in Table 1. Sample sizes for schools are smaller; thus, there are fewer statistically significant differences. For example, involvement in Annenberg or middle-grade programs is unrelated
### Table 1
Descriptive Statistics on Variables Measured for Schools and Students, by Various Levels of School Academic Press

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Students (n = 28,318 6th and 8th graders)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample size</td>
<td>7,984</td>
<td>14,175</td>
<td>6,159</td>
<td>28,318</td>
</tr>
<tr>
<td>1997 math test score&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
<td>-0.218</td>
<td>-0.002</td>
<td>0.281</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.935)</td>
<td>(0.995)</td>
<td>(1.03)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>1996 math test score&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
<td>-0.197</td>
<td>-0.008</td>
<td>0.257</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.898)</td>
<td>(0.989)</td>
<td>(1.07)</td>
<td>(0.996)</td>
</tr>
<tr>
<td>1997 reading test score&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
<td>-0.222</td>
<td>0.000</td>
<td>0.278</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(0.929)</td>
<td>(0.991)</td>
<td>(1.04)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>1996 reading test score&lt;sup&gt;a,b,c,d&lt;/sup&gt;</td>
<td>-0.197</td>
<td>-0.005</td>
<td>0.267</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(0.904)</td>
<td>(0.993)</td>
<td>(1.07)</td>
<td>(0.999)</td>
</tr>
<tr>
<td>Social support&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>-0.145</td>
<td>0.001</td>
<td>0.171</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(0.972)</td>
<td>(1.03)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>SES&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>-0.109</td>
<td>0.077</td>
<td>0.241</td>
<td>0.060</td>
</tr>
<tr>
<td></td>
<td>(0.897)</td>
<td>(0.945)</td>
<td>(0.951)</td>
<td>(0.941)</td>
</tr>
<tr>
<td>% female students</td>
<td>52.4</td>
<td>52.6</td>
<td>51.9</td>
<td>52.4</td>
</tr>
<tr>
<td>% Black students&lt;sup&gt;b&lt;/sup&gt;</td>
<td>55.2</td>
<td>57.2</td>
<td>50.3</td>
<td>55.1</td>
</tr>
<tr>
<td>% Hispanic students&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35.1</td>
<td>26.4</td>
<td>27.3</td>
<td>29.1</td>
</tr>
<tr>
<td>% Asian students&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.0</td>
<td>3.5</td>
<td>4.7</td>
<td>3.4</td>
</tr>
<tr>
<td>% White students&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.7</td>
<td>12.9</td>
<td>17.1</td>
<td>12.4</td>
</tr>
<tr>
<td>% overage&lt;sup&gt;a,b,e&lt;/sup&gt;</td>
<td>18.4</td>
<td>16.2</td>
<td>15.8</td>
<td>16.7</td>
</tr>
<tr>
<td>Number of school changes&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>0.819</td>
<td>0.758</td>
<td>0.650</td>
<td>0.751</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(0.974)</td>
<td>(0.909)</td>
<td>(0.971)</td>
</tr>
<tr>
<td>% Grade 8 (vs. Grade 6)&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>52.0</td>
<td>48.8</td>
<td>50.0</td>
<td>49.9</td>
</tr>
<tr>
<td><strong>Schools (n = 304)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample size</td>
<td>85</td>
<td>144</td>
<td>75</td>
<td>304</td>
</tr>
<tr>
<td>% Annenberg planning grant&lt;sup&gt;b&lt;/sup&gt;</td>
<td>15.5</td>
<td>18.1</td>
<td>24.3</td>
<td>19.0</td>
</tr>
<tr>
<td>% Annenberg implementation grant</td>
<td>25.4</td>
<td>23.6</td>
<td>20.0</td>
<td>23.2</td>
</tr>
<tr>
<td>% middle-grade programs</td>
<td>4.2</td>
<td>1.4</td>
<td>2.9</td>
<td>2.5</td>
</tr>
<tr>
<td>% low-income students&lt;sup&gt;b&lt;/sup&gt;</td>
<td>88.4</td>
<td>82.0</td>
<td>77.5</td>
<td>82.6</td>
</tr>
<tr>
<td>Annual mobility rate (%)</td>
<td>30.2</td>
<td>28.3</td>
<td>25.6</td>
<td>28.1</td>
</tr>
<tr>
<td></td>
<td>(12.9)</td>
<td>(15.1)</td>
<td>(13.8)</td>
<td>(14.3)</td>
</tr>
<tr>
<td>School size&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>749</td>
<td>700</td>
<td>612</td>
<td>691</td>
</tr>
<tr>
<td></td>
<td>(327)</td>
<td>(284)</td>
<td>(207)</td>
<td>(282)</td>
</tr>
<tr>
<td>% predominantly Black schools&lt;sup&gt;b&lt;/sup&gt;</td>
<td>50.6</td>
<td>47.2</td>
<td>36.0</td>
<td>46.2</td>
</tr>
<tr>
<td>% predominantly minority schools</td>
<td>12.9</td>
<td>14.6</td>
<td>16.0</td>
<td>14.5</td>
</tr>
<tr>
<td>% predominantly Hispanic schools&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.1</td>
<td>4.9</td>
<td>8.0</td>
<td>8.2</td>
</tr>
<tr>
<td>% racially mixed schools</td>
<td>12.9</td>
<td>12.5</td>
<td>9.3</td>
<td>11.8</td>
</tr>
<tr>
<td>% integrated schools&lt;sup&gt;b&lt;/sup&gt;</td>
<td>9.4</td>
<td>20.8</td>
<td>30.7</td>
<td>20.1</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations of continuous variables are in parentheses. Group mean differences were computed, and contrasts tested, with one-way analysis of variance.

<sup>a</sup> Contrast of low- vs. medium-press schools significant at *p < .05*.

<sup>b</sup> Contrast of medium- vs. high-press schools significant at *p < .05*.

<sup>c</sup> Variable is a *z* score (*M* = 0, *SD* = 1).

<sup>d</sup> Test scores were z-scored for 6th and 8th graders separately, around the means for each grade level; *z* scores were computed on full sample of students and schools.

<sup>e</sup> Overage students were born at least 2 years before the age cutoff for their grade.
to school academic press. School size shows a pattern, however: High-press schools are smaller, and low-press schools are larger.

One measure of school social composition shows a pattern similar to student demographics in Table 1. Although the proportion of low-income students is high in Chicago schools, the proportions are inversely related to school academic press. School racial composition is also related to academic press: Fewer predominantly Black schools are in the high- than the medium-press category, whereas there are more predominantly Hispanic schools in the low- than the medium-press category. Integrated schools are most likely to be high-press schools and least likely to be low-press schools. The fact that school social composition is related to school academic press suggests the importance of taking composition into account when assessing the effect of academic press on student achievement.

**Grouping Students by Reported Levels of Social Support**

We also investigated descriptive differences among students based on their levels of social support. We divided the 27,945 students with information on this measure into three groups. The "low social support" group includes 26.4% of students, the "medium social support" group includes 49.1%, and the "high social support" group includes 24.4%. Means for the variables describing students, broken into these three social support groups, are displayed in Table 2. We tested contrasts among group means in the same manner as we did for those in Table 1.

In general, the means shown in Table 2 follow a pattern: Relatively more advantaged students report more social support for learning. Group mean differences in achievement for students grouped by social support are, however, somewhat less than by school academic press (Table 1), although they follow a similar trend—students with more social support achieve at higher levels. The 1997 test scores differ by approximately 0.03–0.18 standard deviations. Group mean differences in SES follow the same pattern, but they are larger. The SES of students with high versus medium levels of social support differ by 0.30 standard deviations, for example. There is no relationship between social support and gender, grade level, or average status.

A notable difference between the results in Tables 1 and 2 relates to race: Black students report relatively high social support, but in general these students are in schools with lower academic press. The proportion of Black students is slightly larger in the high than the medium social support group (58% vs. 55%); the proportion is lowest for the group with the least support (53%). In fact, the same pattern is evident for White as Black students: As social support increases, the proportion of White students in the group also increases. However, the pattern for Hispanic students is reversed: There are fewer Hispanics in the high-support (25%) than the medium-support (30%) or low-support (32%) groups. Asian students are equally represented in all three social support groups.

The descriptive results shown in Tables 1 and 2 suggest that students' academic and social backgrounds, as well as school structure and composition, are related to both students' social support and schools' academic press. These descriptive results suggest that in multivariate analyses investigating effects of such
Table 2
Descriptive Statistics on Variables Measured for Students, by Various Levels of Social Support (n = 27,945 6th and 8th Graders)

<table>
<thead>
<tr>
<th>Level of student social support</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>7,384</td>
<td>13,734</td>
<td>6,827</td>
<td>27,945</td>
</tr>
<tr>
<td>1997 math test score</td>
<td>-0.073</td>
<td>-0.017</td>
<td>0.143</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.972)</td>
<td>(0.983)</td>
<td>(1.05)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>1996 math test score</td>
<td>-0.056</td>
<td>-0.024</td>
<td>0.125</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.953)</td>
<td>(0.978)</td>
<td>(1.07)</td>
<td>(0.997)</td>
</tr>
<tr>
<td>1997 reading test score</td>
<td>-0.075</td>
<td>-0.027</td>
<td>0.159</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.970)</td>
<td>(0.982)</td>
<td>(1.05)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>1996 reading test score</td>
<td>-0.065</td>
<td>-0.028</td>
<td>0.155</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.945)</td>
<td>(0.988)</td>
<td>(1.06)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>SES</td>
<td>-0.152</td>
<td>0.043</td>
<td>0.329</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% female students</td>
<td>49.9</td>
<td>53.0</td>
<td>52.6</td>
<td>52.5</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% Black students</td>
<td>53.1</td>
<td>54.6</td>
<td>57.5</td>
<td>54.9</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% Hispanic students</td>
<td>32.3</td>
<td>29.8</td>
<td>24.6</td>
<td>29.2</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% Asian students</td>
<td>3.1</td>
<td>3.5</td>
<td>3.5</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% White students</td>
<td>11.5</td>
<td>12.1</td>
<td>14.4</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>% overage</td>
<td>17.4</td>
<td>16.5</td>
<td>15.6</td>
<td>16.5</td>
</tr>
<tr>
<td></td>
<td>(0.923)</td>
<td>(0.930)</td>
<td>(0.943)</td>
<td>(0.947)</td>
</tr>
<tr>
<td>Number of school changes</td>
<td>0.785</td>
<td>0.746</td>
<td>0.702</td>
<td>0.745</td>
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<tr>
<td></td>
<td>(0.989)</td>
<td>(0.969)</td>
<td>(0.938)</td>
<td>(0.967)</td>
</tr>
<tr>
<td>% Grade 8 (vs. Grade 6)</td>
<td>49.3</td>
<td>50.4</td>
<td>48.2</td>
<td>49.6</td>
</tr>
</tbody>
</table>

*Contrast of low- vs. medium-press schools significant at p < .05.

*Contrast of medium- vs. high-press schools significant at p < .05.

Test scores were z-scored for 6th and 8th graders separately, around the means for each grade level; z scores were computed on full sample of students and schools.

measures on student learning, there is a need to take these variables into account. We now turn to these analyses.

Multivariate and Multilevel Analyses

Unconditional Hierarchical Models

We begin our HLM school effects analysis by partitioning the variance in 1997 achievement in mathematics and reading into within- and between-group components. Only the variance in these outcomes that is between schools may be influenced by school factors. Results of these fully unconditional HLMs are presented in Table 3.

The intraclass correlation (ICC) indicates the proportion of variance in the two achievement tests that lies systematically between schools. Although the ICCs for both achievement measures indicate that a statistically significant proportion of variance is between schools, the ICCs for the two tests are different.
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Table 3
Fully Unconditional HLM Models:
Psychometric Characteristics of Dependent Variables (n = 28,318)

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td>Within-school variance (sigma squared)</td>
<td>0.88</td>
</tr>
<tr>
<td>Between-school variance (tau)</td>
<td>0.49</td>
</tr>
<tr>
<td>Between-school standard deviation</td>
<td>0.70</td>
</tr>
<tr>
<td>Reliability (lambda)</td>
<td>0.96</td>
</tr>
<tr>
<td>Intraclass correlation</td>
<td>0.36</td>
</tr>
<tr>
<td>Reading</td>
<td></td>
</tr>
<tr>
<td>Within-school variance (sigma squared)</td>
<td>0.78</td>
</tr>
<tr>
<td>Between-school variance (tau)</td>
<td>0.22</td>
</tr>
<tr>
<td>Between-school standard deviation</td>
<td>0.47</td>
</tr>
<tr>
<td>Reliability (lambda)</td>
<td>0.96</td>
</tr>
<tr>
<td>Intraclass correlation</td>
<td>0.22</td>
</tr>
</tbody>
</table>

Note: The intraclass correlation is the proportion of total variance in the outcome that lies systematically between schools. It is computed as follows: tau/(tau + sigma squared).

Somewhat more variance in mathematics achievement (36%) is between schools than for reading (22%). “Reliability” in HLM (lambda) indicates how well the observed school means measure true school means. Using this criterion, we see that achievement in both subjects is measured extremely reliably (lambda = .96), a finding related to the large within-school sample sizes. Both ICCs and reliabilities suggest that our search for school effects on these outcomes may be successful.

Within-School HLM Models

Effects of prior achievement. Results of the within-school HLM models for both achievement outcomes are presented in Table 4. The intercepts (average achievement in each subject adjusted for the student characteristics in the within-school HLM) vary significantly between schools. Unsurprisingly, by far the strongest predictor of achievement in 1997 is students’ scores on the same test 1 year earlier (effects of 0.833 standard deviations for math and 0.678 standard deviations for reading, both large effects). Controlling for the student’s score on the same test in 1996 allows us to interpret these outcomes as measures of learning.

Effects of student background. All measures of student background shown in Table 4 are statistically related to learning over the 1996–1997 school year, but effects are small. Relatively larger background effects are found for students’ age-in-grade status: Overage students gain 0.073 standard deviations less in mathematics and 0.075 standard deviations less in reading than their age-appropriate counterparts. Although SES is significantly and positively related to gains in both subjects, the effect is about twice as large for reading (0.068 standard deviations) as for math (0.037 standard deviations). Gender is related to mathematics but not reading gain; boys learn slightly more mathematics (0.02 standard deviations) than girls over a year. Black students learn significantly less than their
<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Mathematics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept ($\beta_p$)</td>
<td>0.053***</td>
<td>0.062***</td>
</tr>
<tr>
<td>1996 achievement</td>
<td>0.833***</td>
<td>0.678***</td>
</tr>
<tr>
<td>Social support ($\beta_s$)</td>
<td>0.017***</td>
<td>0.021***</td>
</tr>
<tr>
<td>SES</td>
<td>0.037***</td>
<td>0.066***</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>−0.018**</td>
<td>0.004</td>
</tr>
<tr>
<td>Black$^a$</td>
<td>−0.069***</td>
<td>−0.123***</td>
</tr>
<tr>
<td>Grade 8$^b$</td>
<td>0.024***</td>
<td>0.028**</td>
</tr>
<tr>
<td>Overage</td>
<td>−0.073***</td>
<td>−0.075***</td>
</tr>
<tr>
<td>Mobility</td>
<td>−0.014***</td>
<td>−0.027***</td>
</tr>
</tbody>
</table>

*Note.* In these models, variances in the outcome and in the social support/achievement slopes were allowed to vary between schools. Between-school variance in the control variables was fixed to zero. All control variables were centered around the grand mean.

These decisions also apply to the analyses presented in Table 5. In the analysis for each subject, the 1996 achievement score in the same subject was used as a control.

$^a$Black students were compared with all other racial groups (White, Asian, and Hispanic) combined.

$^b$Students in Grade 8 compared with those in Grade 6.

**$p \leq .01$.  ***$p \leq .001$.  

non-Black counterparts in both subjects (−0.07 standard deviations in math, −0.12 standard deviations in reading). Mobility is negatively related to learning, more so in reading than in math.

**Effect of social support.** The major findings from Table 4 pertain to social support. There is evidence that social support is positively and significantly related to achievement gains in both subjects (0.017 standard deviations for math, 0.021 standard deviations for reading). These results confirm our hypotheses for Research Question 1. Equally important, the relationship between social support and learning in both subjects varies significantly between schools. On average, the magnitude of the relationship between social support and learning in Chicago elementary schools is small. In some schools, however, it is much larger, and, in yet other schools, the relationship is actually negative.

To assess how much the magnitude of these relationships varies across schools, we computed confidence intervals for each slope.$^4$ For mathematics, this interval is −0.068–0.102; for reading, the interval is −0.063–0.105. These numbers represent the extremes of values for the slopes within which almost all of the schools fall. These intervals provide more evidence that the relationship between social support and learning varies considerably among Chicago's elementary schools. Although, on average, the support/achievement slope within schools is weak, the fact that the relationship varies between schools allows us
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to proceed to the last step in our school effects study. We explore the influence of school academic press on four outcomes: 1-year gains in achievement in mathematics and reading (intercepts) and the relationships between social support and the two achievement gains (slopes).

A detour. Before proceeding to our Level 2 HLM results, however, we investigated an anomalous pattern of descriptive results that can be seen in Table 2. Recall that Black students report higher levels of social support, which is counter to the general pattern in which test scores and SES are higher as social support increases. These descriptive results by race suggest a possible interaction; that is, the relationship between social support and learning might differ for Black students and students of other races. We explored this possibility in a separate within-school HLM model in which we included a Social Support × Race interaction term in the same model as shown in Table 4. The interaction term was not statistically significant. Thus, although social support and race are each significantly related to learning in both subjects (i.e., significant main effects), the relationship between social support and achievement gains is the same for both racial groups. We therefore retained the within-school HLM model shown in Table 4 in our school effects analyses.

Full HLM Models

The top half of Table 5 displays the results of the school effects exploration of achievement gains (the intercept, or \( \beta_0 \), from the within-school model). Although we present results on the intercept and slope outcomes separately, readers should understand that these analyses were conducted simultaneously. Because the results of the within-school models change very little from those presented in Table 4, we have omitted within-school results from Table 5.

School effects on achievement gain. The results displayed in the top half of Table 5 confirm the hypothesis posed with Research Question 2. School academic press has positive and significant effects on learning in both subjects (0.036 standard deviations in math, 0.033 standard deviations in reading, both significant at \( p < .001 \)). Although whether or not a school is involved with Annenberg reform is unrelated to achievement gains (not surprising given that participating schools were in their first year of Annenberg program involvement), other measures of school structure are related to learning. Participation in a middle-grade program is negatively associated with young adolescents' math learning (−0.101 standard deviations) but is statistically unrelated to reading gains (although the coefficient is also negative). We have evidence that students in larger schools learn less. Relative to students in middle-sized schools, students in large schools learn less mathematics (−0.048 standard deviations). The same comparison for reading achievement is marginal but in a similar direction (−0.039 standard deviations).6

Beyond the association of students' background with their learning, our results indicate that school social composition also influences how much students learn over the course of a year. As the proportion of low-income students goes up in a school, average learning goes down (recall that, on average, this proportion is quite high). In this case, the effect is more than twice as large for reading (−0.063 standard deviations) as for math (−0.027 standard deviations). School racial com-
Table 5
Full Between-School HLM Model for Students’ 1997 Mathematics and Reading Achievement (n = 28,318)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Mathematics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average achievement (β₀)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.031</td>
<td>0.032</td>
</tr>
<tr>
<td>School academic press</td>
<td>0.036***</td>
<td>0.033***</td>
</tr>
<tr>
<td>Annenberg grant status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning grant</td>
<td>0.021</td>
<td>0.031</td>
</tr>
<tr>
<td>Implementation grant</td>
<td>-0.001</td>
<td>-0.013</td>
</tr>
<tr>
<td>Middle-grades program</td>
<td>-0.101**</td>
<td>-0.027</td>
</tr>
<tr>
<td>% low-income students</td>
<td>-0.027*</td>
<td>-0.063***</td>
</tr>
<tr>
<td>School racial composition*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominantly minority</td>
<td>-0.014</td>
<td>-0.021</td>
</tr>
<tr>
<td>Predominantly Hispanic</td>
<td>0.016</td>
<td>-0.023</td>
</tr>
<tr>
<td>Racial mixed</td>
<td>0.066*</td>
<td>0.044</td>
</tr>
<tr>
<td>Integrated</td>
<td>-0.027</td>
<td>0.036</td>
</tr>
<tr>
<td>School size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small vs. medium</td>
<td>0.027</td>
<td>0.006</td>
</tr>
<tr>
<td>Large vs. medium</td>
<td>-0.048*</td>
<td>-0.039*</td>
</tr>
<tr>
<td>Average mobility rate</td>
<td>0.000</td>
<td>-0.007</td>
</tr>
<tr>
<td>Social support/achievement slope (β₁)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.037***</td>
<td>0.030***</td>
</tr>
<tr>
<td>School academic press</td>
<td>0.040**</td>
<td>0.025**</td>
</tr>
<tr>
<td>Annenberg grant status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning grant</td>
<td>-0.013</td>
<td>-0.021</td>
</tr>
<tr>
<td>Implementation grant</td>
<td>-0.007</td>
<td>-0.017</td>
</tr>
<tr>
<td>Middle-grades program</td>
<td>0.001</td>
<td>0.051*</td>
</tr>
<tr>
<td>% low-income students</td>
<td>0.035*</td>
<td>0.019*</td>
</tr>
<tr>
<td>School racial composition*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominantly minority</td>
<td>0.000</td>
<td>-0.002</td>
</tr>
<tr>
<td>Predominantly Hispanic</td>
<td>-0.011</td>
<td>0.016</td>
</tr>
<tr>
<td>Racial mixed</td>
<td>-0.001</td>
<td>-0.019</td>
</tr>
<tr>
<td>Integrated</td>
<td>0.013</td>
<td>-0.015</td>
</tr>
<tr>
<td>School size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small vs. medium</td>
<td>0.007*</td>
<td>0.007</td>
</tr>
<tr>
<td>Large vs. medium</td>
<td>0.038**</td>
<td>0.003</td>
</tr>
<tr>
<td>Average mobility rate</td>
<td>0.041</td>
<td>0.012*</td>
</tr>
</tbody>
</table>

Note. To reduce the number of values presented, we have chosen not to present within-school parameters in this model. They are almost unchanged from the results of the within-school model presented in Table 4. The two Annenberg grant categories are separately compared with schools without either type of Annenberg grant.

*Each of these school racial composition categories is compared with predominantly Black schools.

*p ≤ .10.  *p ≤ .05.  **p ≤ .01.  ***p ≤ .001.
position has few effects on learning, once school size, social composition, and academic press are taken into account. Only one comparison is statistically significant: 1-year gains in mathematics in racially mixed schools are 0.066 standard deviations higher than in predominantly Black schools (the comparison group).

*School effects on support/achievement gain slope.* The bottom half of Table 5 displays the results of our school effects analysis on the relationship between achievement gain and social support. Recall from the results in Table 4 that the relationship ($\beta_1$) was significant and positive. In the average Chicago elementary school, the relationship between social support and achievement gain is 0.037 standard deviations for mathematics and 0.030 standard deviations for reading. The magnitudes of these slopes are important to keep in mind in making sense of results of the slopes-as-outcomes analyses. School academic press is positively related to the slope in both subjects (0.040 standard deviations in math, 0.025 standard deviations in reading). This confirms the hypotheses we posed for Research Question 3. The meaning of this cross-unit interaction is important: Students with high levels of social support learn even more in schools with high levels of academic press. Conversely, students with low levels of social support learn less in schools with lower levels of academic press.

We also have some evidence that school structure and composition influence these slopes. The support/achievement slopes in both subjects are magnified in low-income schools—more so in mathematics (0.035 standard deviations) than reading (0.019 standard deviations). For math gains only, there is evidence that the relationship is magnified in both large and small schools relative to medium-sized schools.\(^7\)

Shouse's (1996) finding that school communal organization and academic press were more important in low-SES schools led us to a similar exploration. We computed an interaction (cross-product) term between variables measuring the percentage of low-income schools and academic press. In this study, the three-way interaction reported by Shouse would show up as a significant cross-unit interaction effect on the support/achievement slope. However, our analyses indicated no significant interaction effects on either the intercepts or the slopes.\(^8\) A reasonable explanation for the difference between Shouse's results and ours is the samples. Whereas he examined a nationally representative sample of secondary students and schools, our sample was younger and more socially homogeneous, and all of the students attended inner-city elementary schools.

*Social Support, Academic Press, and Learning*

Although we have discussed them separately, the results of the HLM models displayed in Table 5 should be considered in tandem. Not only do students learn more in schools with higher levels of academic press, but the way in which students' social support influences their learning is affected by the types of schools they attend. This rather complex relationship may be better understood when displayed graphically. Achievement gains in mathematics and reading are displayed in Figure 2 and Figure 3, respectively. In these bar graphs, the heights of the bars were derived from results shown in Table 5. Thus, their heights are

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Figure 2. Achievement gains in mathematics for students with varying levels of social support in schools with different levels of academic press

net of differences among the social and academic backgrounds of students and the schools' compositions and structures.

Similar to the descriptive results shown in Tables 1 and 2, achievement gains in the two subjects are presented for students reporting low, medium, and high levels of social support. Students with "low social support" are 1 standard deviation below the mean on this variable (light bars); students with "medium social support" are average (i.e., zero) (gray bars); and students with "high social support" are 1 standard deviation above the mean (black bars). We separate the results for these three types of students into schools with different levels of academic press. Schools with "low academic press" are 1 standard deviation below the mean on this variable, "medium academic press" schools are average for Chicago elementary schools, and "high academic press schools" are 1 standard deviation above the mean. One-year gains in these subjects are displayed in between-school effect size units, computed with the HLM results from Table 5.9

These graphs demonstrate that the relationship between social support and learning is contingent on the type of schools students attend. Students with much social support learn quite a lot if they are also fortunate enough to attend schools with high academic press (the advantages for a student with these characteristics are 1.1 between-school standard deviations in math and 0.8 standard
deviations in reading). In fact, a hypothetical student with average social support who attends a high academic press school would learn as much in both subjects as his or her counterpart with high social support in a medium academic press school (about 0.5 standard deviations in math and 0.4 standard deviations in reading). On the other hand, the unfortunate student with little social support who also happens to attend a school with low academic press would be particularly disadvantaged. Such a student would actually lose ground in achievement over the course of a year (−0.6 standard deviations in math, −0.4 standard deviations in reading). Even if students in such schools have substantial social support on which they may draw, they learn almost nothing in either subject over the course of a year if they attend schools with low academic press.

We speak here of hypothetical students. To determine whether there were actually students in the categories shown in Figures 2 and 3, we investigated the distribution of students, based on their reported levels of social support, who attend schools at varying levels of academic press. We found that students with different levels of support are rather evenly distributed in schools categorized by level of academic press.10

The results presented in Table 5 and Figures 2 and 3 provide empirical support for the hypothesis we posed with Research Question 3. The relationship
between the amount of social support a young adolescent has to draw on and how much he or she learns over the course of a year in these important subjects is either ameliorated or magnified depending on the degree to which his or her Chicago elementary school stresses academics.

Discussion

School Reforms Focusing on Improving Social Support

Several current reforms advocate strengthening the personal relationships students have with people who may help them develop academically. Increasing social support for academic endeavors is seen as an important mechanism for improving students’ learning. U.S. schools in the inner city are seen as particularly problematic places, student achievement in these schools is especially low, and the children residing in large cities and attending city schools are likely to experience social disadvantages along several dimensions. For these reasons, reformers have argued that increasing the social support that inner-city children may draw upon is a promising way to improve their academic performance. This study has tested the validity of these claims among these types of children and schools.

Our findings provide limited empirical support for the contention that increasing social support for students in inner-city schools will improve their learning. Although, on average, the relationship between social support and learning for Chicago’s young adolescents is positive, the link is not a strong one. More important is our finding that the relationship between social support and learning depends on the type of school a young adolescent attends. That is, social support is strongly associated with learning in some schools, while the two factors are unrelated in other schools. And, in some schools, students with more social support actually learn less. Therefore, we suggest that a focus on the average relationship between social support and learning in schools may be misleading. And a focus on only improving social support may be misguided.

Revisiting the Issue of Equality

Earlier in this article, we discussed the fact that the relationship between social support and learning might be seen through the lens of educational equity. Because social support is only modestly helpful in helping children learn, our results raise an obvious question: “In which types of schools is social support strongly associated with student learning?” Our findings here are clear. In schools with a strong press toward academics, students who experience high levels of support learn quite a lot. In schools where the academic press is low, even students with high levels of social support do not learn. And for students who do not have much social support to draw on, attending a school with high levels of academic press does not help them learn.

Although the current reform movement that advocates standards-based reform is very popular, school professionals and policymakers alike worry that raising standards will leave some people behind. This issue invokes particular concern in school systems such as Chicago’s. Our findings suggest that this kind
of worry is valid. Although he was referring to another type of problem in schools, Phillip Cusick's comment is quite appropriate here: "Such a system may further disadvantage the already disadvantaged" (Cusick, 1983, p. 76).

Within the upper grades in Chicago's elementary schools, our results indicate that schools with high levels of academic press do leave some students behind—those students who have little support to draw on from their teachers, their parents, their peers, or their neighborhoods. Our results suggest that social support is particularly effective when students attend schools that push them toward academic pursuits. Without support to draw on, these students are in trouble academically. But if they do have this kind of support, they learn quite a lot. Thus, schools with a strong press toward academic pursuits can be inequitable places.

Our point is that reforms that focus on both the academic and the social domains of schooling are important, as opposed to the "either-or" reform strategy that the Phillips (1997) study would suggest. To succeed in schools that press them to learn, students need support from the people with whom they interact. Our use of a composite measure of support suggests, rather than a focus on the source of support, consideration of the total amount of support. Our results suggest that a concern that pushing students hard and raising standards will leave some students behind may be justified. In Chicago schools that press students academically, students need support. The more they get, the more they learn. If students in such environments do not get support from parents or from friends (or even if they do), teachers should also create classroom environments that provide personal support for learning.

Our results confirm the importance of the type of support argued for by Marks et al. (1996): "a learning environment that at once communicates high expectations for achievement and offers consistent help for students to meet those expectations" (p. 209). We are not arguing against pushing such students to excel academically and holding high expectations for their performance. Rather, our findings suggest the importance of providing social support for students in these environments. Our results indicate rather clearly that when students are both supported and pressed, learning results. When either of these elements is lacking in children's learning environment, they learn less. When both are lacking, our findings suggest that children actually lose ground academically.

Why Study These Phenomena in Chicago?

There are both advantages and disadvantages to locating an examination of these issues in a single inner-city school system. An obvious disadvantage, at least for some observers, is that the samples of students and schools used in this study are not nationally representative. They also focus on schools whose structure is uncommon: K–8 schools. We admit that, in absolute terms, the external validity of our findings is limited. However, we argue that the advantages of studying these phenomena in the public schools of Chicago outweigh the disadvantage of nonrepresentativeness for at least three reasons.

One reason is actual variability. Some might think that the schools and students in an inner-city district are quite homogeneous. Our results argue to the
contrary. We found much variation among Chicago's elementary schools in the degree to which they stress academics. We also find that Chicago's students report much variation in the degree to which they experience support from the sources we considered. Moreover, the standardized test scores for Chicago's students are not dramatically different from national norms. Although the absolute means on some of the variables we consider may differ from a nationally representative sample, variability is substantial, distributions are normal, and relationships are sizable.

A second value in studying these phenomena in Chicago is the sample. Although our findings are not generalizable to the nation's public schools, the sample to which they may be generalized—our nation's most disadvantaged students and schools—lends a special importance to these results.

A final reason is the quality of the data. The data used in this study are available on the population of students, teachers, and schools, not a sample. The fact that the Consortium for Chicago School Research has been collecting regular data on so many students, teachers, and schools, along with the fact that the data are linked to annual test scores and other student outcomes, has resulted in an ongoing and publicly accessible longitudinal database of exceptional quality on an important segment of America's school population. The ability to temporally link students' reports of support and reports from teachers with whom they had contact over the same time period (through the schools of which both are members) with the gains in achievement measured over the same period eliminates a serious (and often overlooked) measurement issue in educational research. Teachers' and students' reports of their schools' academic press were collected during the same school year. Because the current reform environment holds high hopes that schools will change substantially over rather short time spans, such temporal specificity is especially important. For all of these reasons, we believe that our findings in regard to social support, academic press, and learning among Chicago's students and schools should be taken seriously.

**Importance of What Happens in Schools**

Our final comments are directed to reforms that target personal relationships as a way to improve student performance in school. The findings from this study suggest that reforms that are directed primarily to improving personal relationships between students and their teachers as a means to improve student learning miss something important. Only in schools with an organizational thrust toward serious academics does social support actually influence learning.

It is critical, therefore, that reforms target changing schools as well as the individuals in them. Students learn more in schools that set high standards for academic performance, that use their instructional time wisely, and that use student learning as a criterion for making decisions. Moreover, we suspect that the character of the social support that students draw on in such schools is likely to be focused on academic rather than personal issues. It is heartening to find such academically oriented schools in Chicago, and it is encouraging to find that students learn more in these schools. Personal relationships between students and their teachers, their friends, their parents, and those in their neighborhoods
are important. But they are especially important when the support is aligned with the aims of the schools and when these aims are focused on learning.

APPENDIX

Descriptive Information on All Variables Used in the Chicago Study of Social Support and Achievement

Measures Describing Students

1997 Mathematics Score: Scores for sixth and eighth graders combined into a single scale. Each student’s grade equivalent score on the mathematics section of the Iowa Test of Basic Skills (ITBS) administered to all Chicago elementary school students each year. Score converted to a z score \( M = 0, SD = 1 \), centered around sixth- or eighth-grade mean on this sample of students.

1997 Reading Score: Scores for sixth and eighth graders combined into a single scale. Each student’s grade equivalent score on the reading section of the ITBS administered to all Chicago elementary school students each year. Score converted to a z score \( M = 0, SD = 1 \) centered around sixth- or eighth-grade mean on this sample of students.

1996 Mathematics Score: Scores for sixth and eighth graders combined into a single scale. Students’ Rasch-equated mathematics score from the 1996 ITBS, scaled for item difficulty, converted to a z score \( M = 0, SD = 1 \) centered around each grade-level mean.

1996 Reading Score: Scores for sixth and eighth graders combined into a single scale. Students’ Rasch-equated reading score from the 1996 ITBS, scaled for item difficulty, converted to a z score \( M = 0, SD = 1 \) centered around each grade-level mean.

Social Support for Learning: This variable is the factor-weighted sum of four composite measures drawn from student surveys, each describing the support students receive from a single source: teachers, peers, parents, or the community. Each composite was created as a Rasch-equated score. In the factor analysis of the composites, factor scores were .39 for support from teachers, .33 for support from peers, .39 for support from parents, and .42 for support from the community. The four composites were weighted by these factor scores and averaged. The score was then reconverted to a student-level z score \( M = 0, SD = 1 \).

The items making up the composite measure of support from teachers asked students the frequency with which their mathematics and English teachers (a) notice if they are having trouble learning something, (b) relate the subject to their personal interests, (c) really listen to what they say, (d) help them catch up if they are behind, (e) don’t know them very well (reversed), (f) believe they can do well in school, and (g) are willing to give help on schoolwork if they need it.

The items making up the composite measure of support from peers asked students the degree to which they agree with statements about whether most students in those classes (a) treat each other with respect, (b) work together to solve problems, (c) help each other learn, (d) often disrupt class (reversed), (e) like to put others down (reversed), (f) just look out for themselves (reversed), (g) don’t care about each other (reversed), (h) don’t get along together very well (reversed), (i) make fun of other students who do well in the class (reversed), and (j) whether the teacher believes the student can do well in school.

The items making up the composite measure of support from parents include students’ views about how often their parents (or other adults in the household) (a) discuss with them selecting courses or programs at schools, (b) discuss with them school activities or events of interest to the student, (c) help with homework, (d) discuss with them things they had studied in class, (e) check their homework, (f) discuss with them going to college, (g) discuss homework with them, (h) praise them for doing well in school, (i) talk
with them about why they weren't doing their homework, (j) discuss their grades with
them, (k) encourage them to take responsibility for the things they have done, and (l)
encourage them to work hard in school.

The items making up the composite measure of support from the community were
asked only in the survey for eighth graders. Individual items ask students' level of agree-
ment with the following statements: (a) if there is a problem in the neighborhood, neigh-
bors get together to solve it; (b) people in the neighborhood can be trusted; (c) adults in
the neighborhood can be counted on to see that children are safe and don't get in trouble;
(d) buildings and equipment in the neighborhood park are well kept; (e) there are adults
in the neighborhood whom children can look up to; (f) neighborhood adults know who
the local children are; and (g) no one in the neighborhood cares much about what hap-
pens there (reversed).

Female: Dummy coded 1 if student is female, 0 if student is male.

SES: A composite measuring family socioeconomic status (z-scored \( M = 0, SD = 1 \)) for
this sample. Composite includes parents' education (higher of mother's or father's, if
student lives with both parents) and the number of educationally related possessions in
the home.

Black: Dummy variable coded 1 if student is African American, 0 otherwise. Com-
parison is, thus, Hispanic, Asian, and White students.

Mobility: A continuous variable measuring the number of times a student has changed
schools, within the Chicago Public Schools, in the last 3 years (i.e., since 1994). Converted
to a z score \( (M = 0, SD = 1) \) for this sample of students.

Overage: Dummy variable coded 1 if the student is 2 or more years older than she or
he should be in his or her grade, 0 otherwise. For sixth graders, the cutoff was September
1986; for eighth graders, the cutoff was January 1984.

Measures Describing Schools

School Academic Press: This variable is the sum of school aggregates of two composite
measures drawn from teachers and students. The sum was standardized to a z score
\( (M = 0, SD = 1) \) for this sample of schools. Each composite was created as a Rasch-equated
score.

The first component, drawn from teachers' reports that the school focuses on student
learning, included items registering teachers' opinions about whether their schools (a)
focus on what's best for student learning when making important decisions, (b) set high
standards for academic performance, (c) organize the school day to maximize instruc-
tional time, and (d) work to develop students' social skills.

The second component is drawn from students' reports about whether their teachers
challenge them to reach high levels of academic performance. This included items asking
students' opinions about whether their math and English teachers (a) encourage them to
do extra work when they don't understand something, (b) praise their efforts when they
work hard, (c) care if they don't do their work in that class, (d) care if they get bad grades
in that class, (e) often put them down in that class (reversed), (f) expect them to do their
best all the time, (g) expect them to complete homework every night, (h) think they are
dumb if they ask a question about something they don't understand (reversed), and (i)
think it is very important that they do well in that class.

To present descriptive information in Table 1, we categorized the 304 schools ac-
cording to their level of academic press on this variable, as follows: 28% were "low
academic press" schools \( (n = 85) \); 47% were "medium academic press" schools \( (n = 144) \);
and 25% were "high academic press" schools \( (n = 75) \).

Annenberg Status: We created three categories based on whether the schools had
received Annenberg grants through the 1996–1997 school year: (a) received no Annenberg
grant, (b) received an Annenberg planning grant (only), and (c) received an Annenberg

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implementation grant. We created two dummy-coded (0, 1) variables, allowing us to separately compare Chicago schools receiving Annenberg planning and implementation grants with schools without Annenberg support.

**Middle-Grades Program:** This dummy-coded (0, 1) variable is an indicator of whether the school is either a stand-alone middle school (unusual in Chicago) or an elementary school with a separate middle-grade program. The comparison group is all other Chicago schools that enroll sixth and eighth graders but do not have separate programs for the middle grades.

**School Size:** We began with a variable describing the number of students in the school. We created two dummy-coded (0, 1) variables from the continuous measure: (a) schools enrolling 350 of fewer students and (b) schools enrolling 750 students or more students. The comparison group is schools enrolling 351–750 students.

**Percentage Low Income:** Percentage of students in the school with low family incomes. "Low family income" is based on federal guidelines for poverty status. This variable was converted to a z score ($M = 0$, $SD = 1$) for this sample of schools.

**School Racial Composition:** From a set of variables that indicate the proportions of Black, Hispanic, Asian, and White students enrolled in Chicago schools, five disjoint categories were created: (a) predominantly Black schools, (b) predominantly minority schools, (c) predominantly Hispanic schools, (d) racially mixed schools, and (e) racially integrated schools. Four dummy (0, 1) variables were created from these categories. The noncoded comparison group is the predominantly Black schools.

**School Mobility:** This measure of annual mobility is the percentage of students who are new to the school each year, averaged over the last 10 years. This variable was converted to a z score ($M = 0$, $SD = 1$) for this sample of schools.

**Notes**

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1HLM used in a school effects context typically involves three steps. The first step partitions variance in the dependent measure into its within- and between-school components. Only the proportion of variance in the outcome that lies systematically between schools may be modeled as a function of school characteristics. The second step estimates a within-school model. In each school, the dependent measure is estimated as a function of the characteristics of group members (in this case, students). The third step estimates the effect of school factors on between-school variance in the outcomes, taking into account characteristics of both students in the school and the school itself. In the third step, we estimate the effect of school academic press on achievement and its distribution by the level of students’ social support.

2In this analysis, the relationships between social support and achievement in the two subjects are distributional outcomes (i.e., slopes as outcomes). Exploring distributional outcomes dictated several decisions within our HLM models. Both the achievement outcomes and the support/achievement slopes were allowed to vary between schools (i.e., they were "free"). Other independent variables measuring characteristics of students were included as controls; thus, we constrained the between-school variance in these relationships to zero (i.e., they were "fixed"). Social support was centered around the individual school means, whereas the control variables were centered around their respective grand means.

3We remind readers that the SES variable was created on the sample of students in Chicago. Thus, a mean SES of "0" indicates "average" in Chicago. It may not be interpreted as "middle class," since this is not a nationally representative sample of students. Given the high propor-
tion of low-income students in Chicago schools, the "average SES student" is actually quite disadvantaged in socioeconomic terms.

These confidence intervals were computed in the standard manner, by adding and subtracting 1.96 times the between-school standard deviation for each slope (i.e., the square root of tau for that outcome). Between-school standard deviations for the slopes were 0.0432 in mathematics and 0.0431 in reading. The typical interpretation for a confidence interval is that 95% of sample members fall within this range.

For the interaction analyses, we effect-coded the race indicator (1 = Black, -1 = all others) and created an interaction term as the cross product of this variable and social support. All predictor variables were grand-mean centered, and their between-school variances were fixed to zero.

Although all of the schools in this analysis enroll sixth and eighth graders, not all schools are K-8 schools (a small number are stand-alone middle schools or enroll students only in the upper elementary grades). Because grade level inclusion is not constant across the schools, we do not draw substantive inferences from the findings on school size in this study. For an analysis targeted on assessing school size effects in Chicago schools, see Lee and Loeb (in press).

In separate HLM analyses, we examined the possibility of a context effect for social support. That is, we created a macro-level measure by aggregating our social support measure across schools. We entered this aggregate measure—average social support—into an analysis identical to those shown in Tables 4 and 5. Average social support was not statistically significantly related to learning. Therefore, we may conclude that social support, at least in Chicago schools, is more appropriately considered at the micro than the macro level.

To more closely parallel the interaction findings from the Shouse (1996) study, we also investigated an interaction between academic press and average SES (which we created as an aggregate of the student-level SES measure). This interaction was nonsignificant on both the slope and the intercept.

The numbers on this graph are computed through the use of the results in Table 4, as follows. For mathematics achievement, we used the following equation:

\[ y = .031 + .036(\text{ACADPRS}) + .037 + (.040 \times (\text{ACADPRS}) \times \text{SOCSPRT}) ], \]

where ACADPRS takes on the values of -1, 0, and 1 for students with low, medium, and high levels of academic press; SOCSPRT takes on the values of -1, 0, and 1 for schools with low, medium, and high levels of social support; .031 and .036 are the intercept and the gamma coefficient for academic press on average achievement; and .037 and .040 are the intercept and the gamma coefficient for academic press on the social support/achievement slope. We followed the same procedure for reading achievement, using the equation

\[ y = .032 + .033(\text{ACADPRS}) + .030 + (.025 \times (\text{ACADPRS}) \times (\text{SOCSPRT}) ] . \]

These numbers were converted to between-school effect size units by dividing each by the between-school standard deviation of the outcome computed from the within-school models shown in Table 3 (.131 for mathematics, .143 for reading).

For this analysis, we divided students into three groups that roughly parallel the groups shown in Figures 2 and 3: those whose levels of social support were more than 1 standard deviation above and below the mean and those who fell in the middle group (less than 1 standard deviation from the mean on either side). We also divided the schools into three levels of academic press, based on the same criteria. Of the 14% of students in high-press schools, 12% are students with low levels of social support, and 19% report high levels of support. Conversely, of the 15% of students in low-press schools, 13% are low-support students, and 13% report high levels of support. Thus, each of the categories represented by the bars in Figures 2 and 3 actually has substantial numbers of Chicago students in it. Based on these categorizations, about half of the student sample (52%) falls into the middle category (i.e., students with medium levels of support who attend medium-press schools).

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